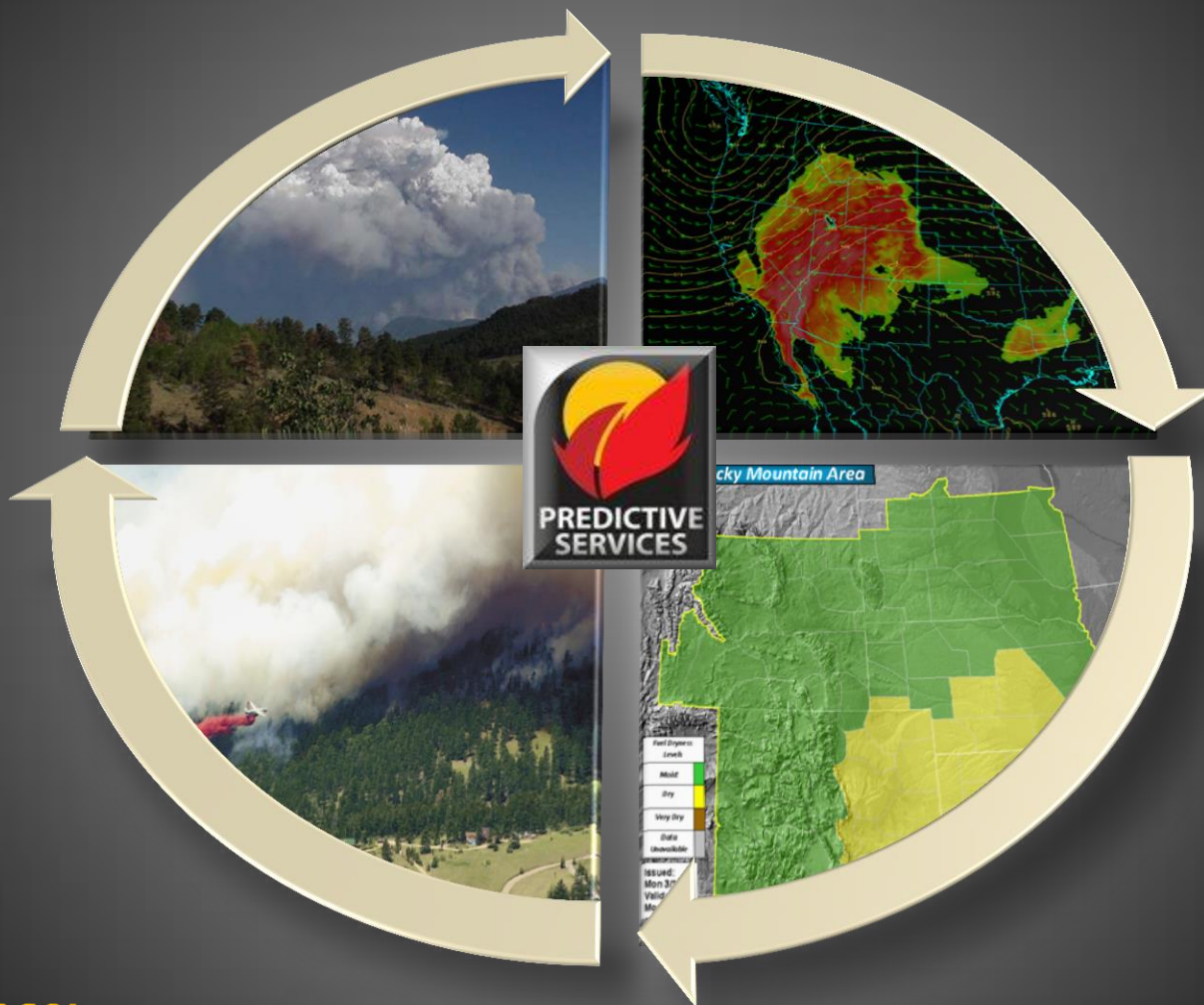




# Predictive Services

2016 Rocky Mountain Area Seasonal Outlook – May 27, 2016



Correspondence:  
Tim Mathewson—Fire Meteorologist  
[t2mathew@blm.gov](mailto:t2mathew@blm.gov)



# Seasonal Outlook

## *Considerations*

### Antecedent Conditions

- ☐ Weather Patterns of 2016 (Late Spring-Early Summer)
- ☐ Temperature Anomalies
- ☐ Current Drought Conditions and Comparisons
- ☐ Precipitation and Snowpack Comparisons

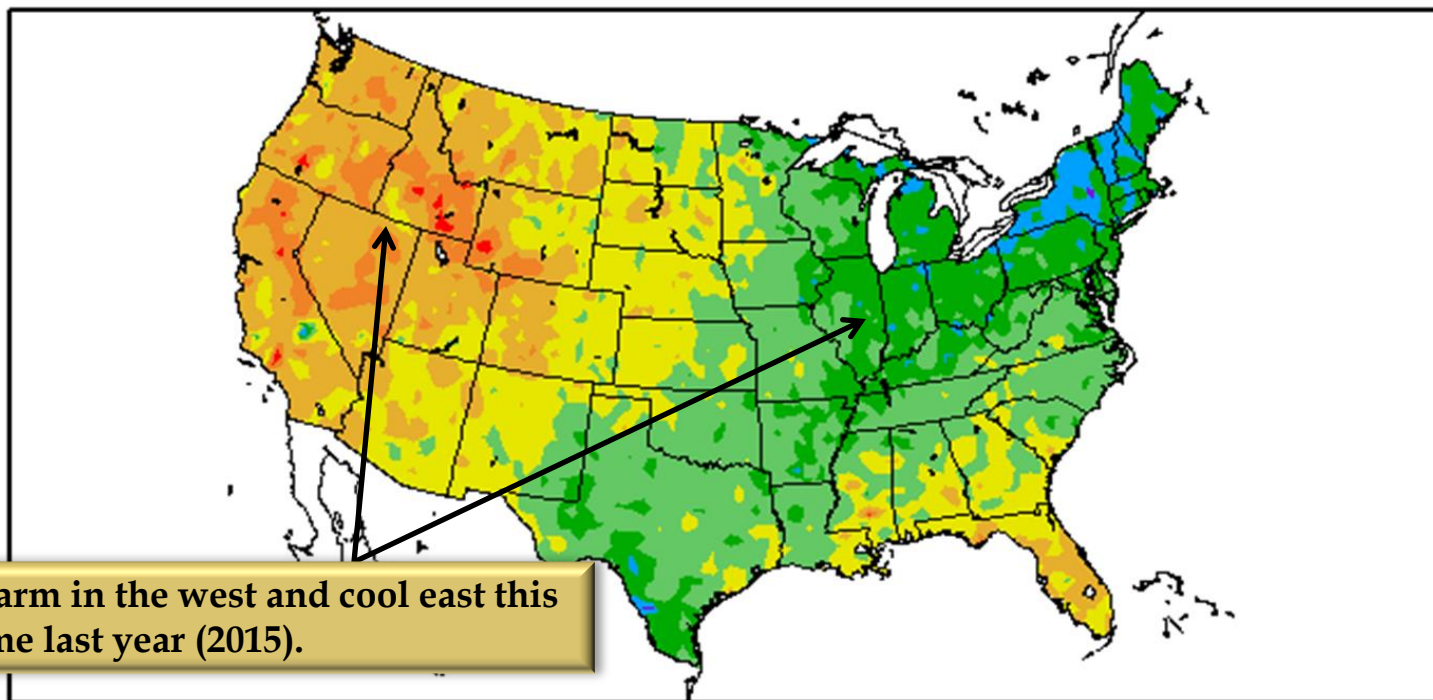
### Prediction

- ☐ Predictors
  - ☐ General SST Anomalies and Predictions (El Nino, La Nina)
  - ☐ Past Robust El Nino's (1942, 1958, 1966, 1973, 1983, 1987, 1992, 1998) and Temperature/Precipitation Impacts
- ☐ Short Term and Long Term Forecast Charts
- ☐ Final Thoughts and Considerations for the Summer and Fall 2016

# Seasonal Outlook

*Temperature Departure From Normal Since Jan 1, 2015*

Departure from Normal Temperature (F)  
1/1/2015 – 6/4/2015



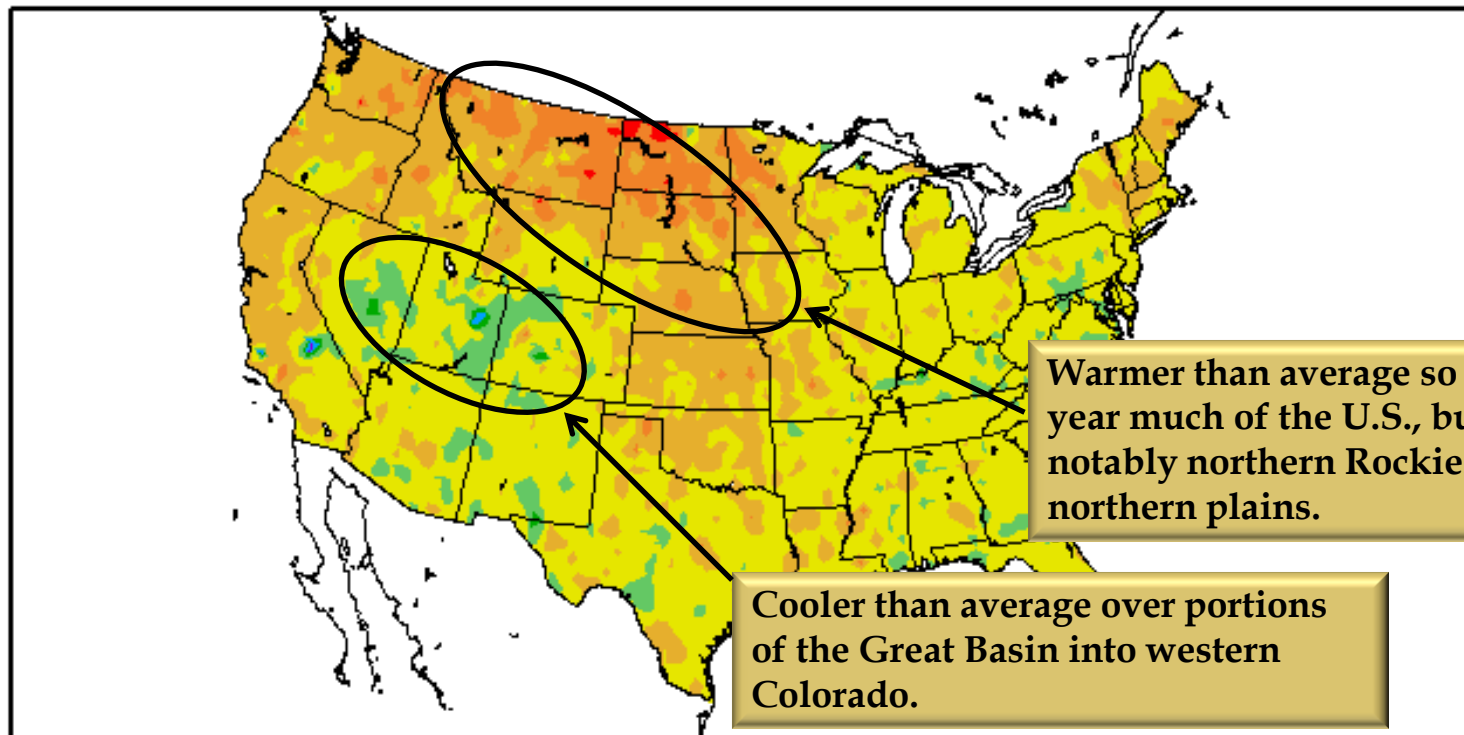
Warm in the west and cool east this time last year (2015).



# Seasonal Outlook

*Temperature Departure From Normal Since Jan 1, 2016*

Departure from Normal Temperature (F)  
1/1/2016 – 5/25/2016

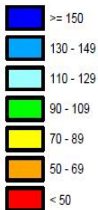


# Seasonal Outlook

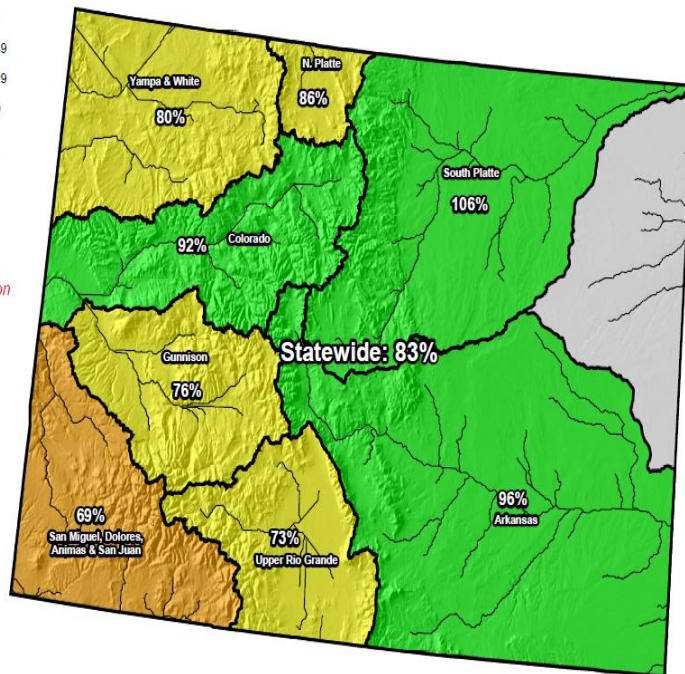
## Colorado February Snowpack Comparisons

### Colorado SNOTEL Snowpack Update Map

Percent of Median



Provisional Data  
Subject to Revision



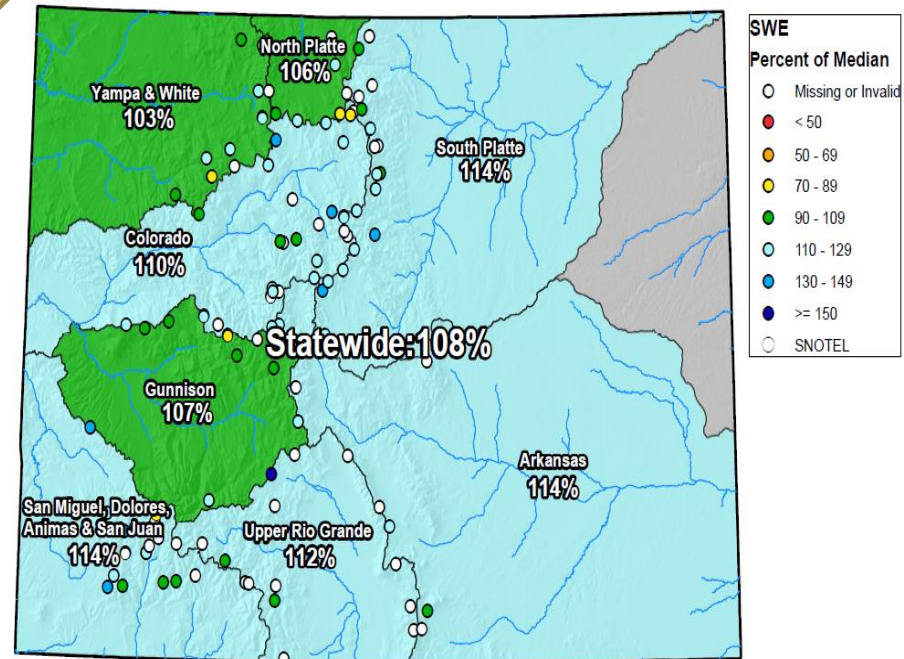
Current as of 02/24/2015

\*Data may not provide a valid measure of conditions

2015 - 2016

### Colorado SNOTEL Snow Water Equivalent (SWE) Update Map with Site Data

Current as of Feb 16, 2016



0 25 50 100 150 200 Miles



United States Department of Agriculture  
Natural Resources Conservation Service

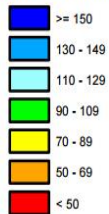
Snowpack values in February 2015 showed more deficits, especially west of the continental divide, in comparison to February 2016

# Seasonal Outlook

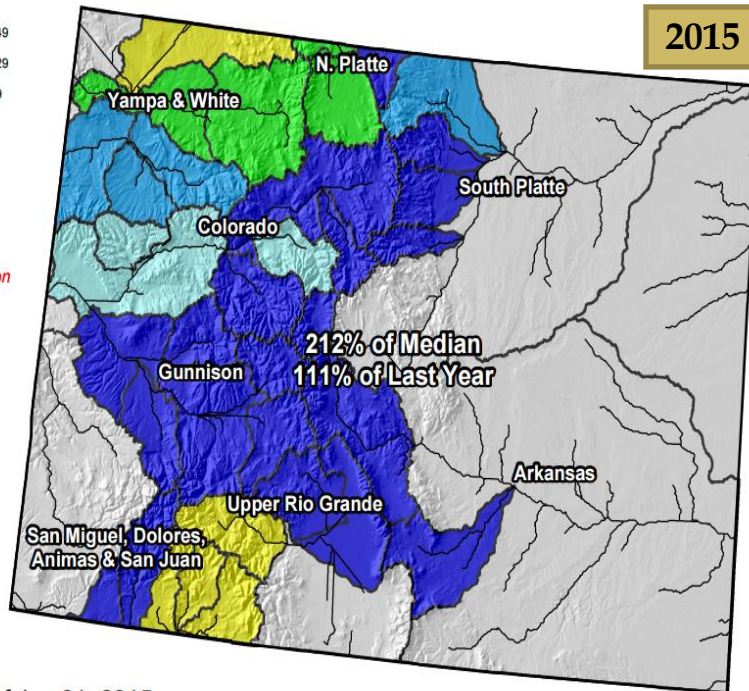
## Colorado Late May Snowpack Comparisons

### Colorado Snowpack Map

#### Percent of Median



Provisional Data  
Subject to Revision

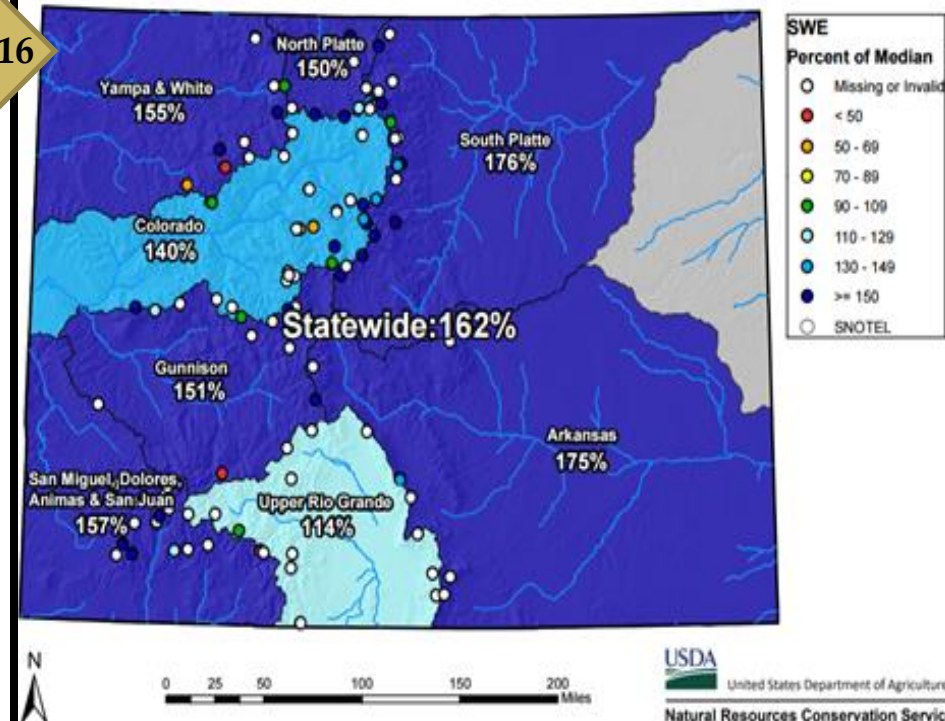


2015 - 2016



### Colorado SNOTEL Snow Water Equivalent (SWE) Update Map with Site Data

Current as of May 26, 2016

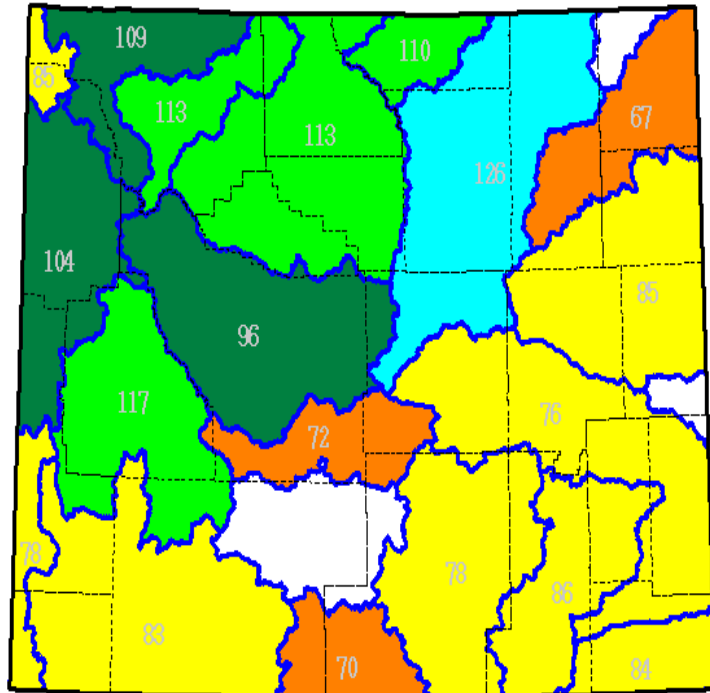


Snowpack values currently greater than this time last year (June 1, 2015 vs. May 26, 2016).

# Seasonal Outlook

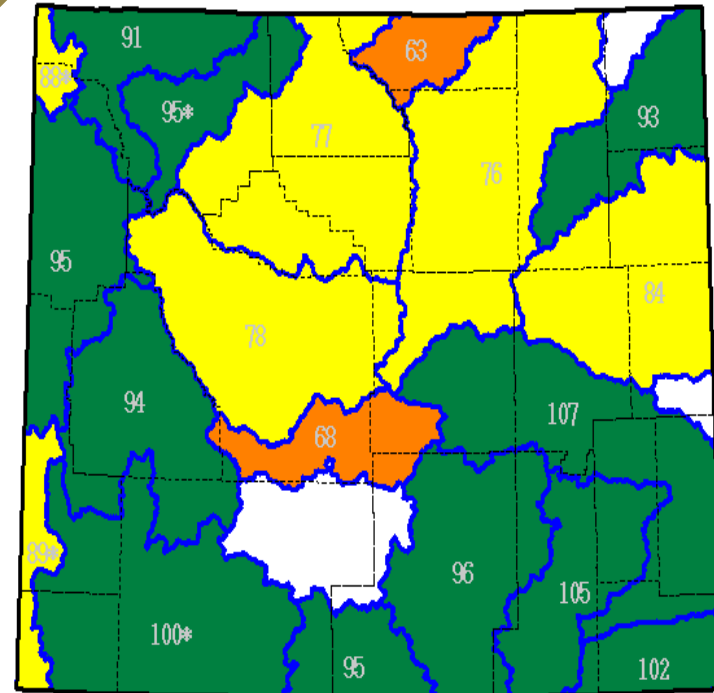
## Wyoming February Snowpack Comparisons

SWE % of Median as of Monday, 23 February 2015



2015 - 2016

SWE % of Median as of Tuesday, 16 February 2016



Produced by the Wyoming Water Resources Data System: <http://www.wrds.uwyo.edu>

\* \* Data may not provide a valid measure of conditions

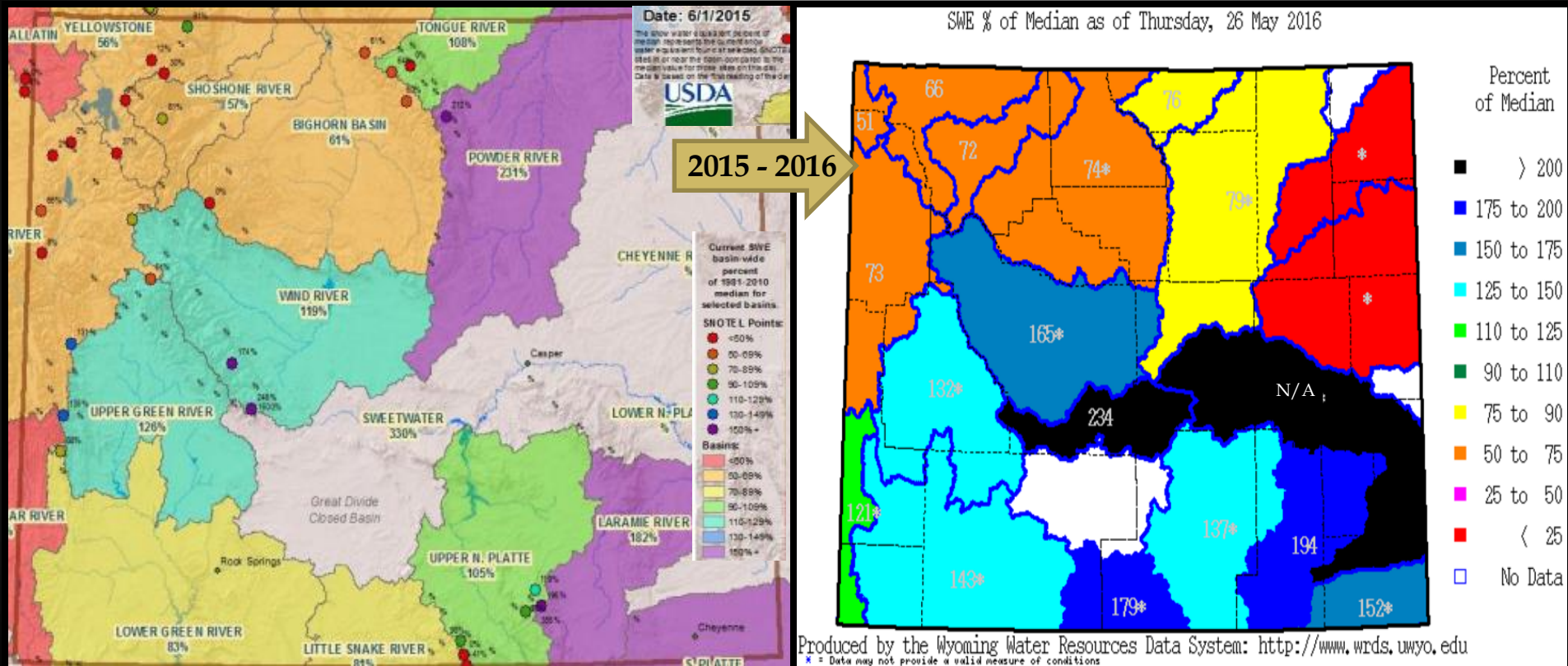
Produced by the Wyoming Water Resources Data System: <http://www.wrds.uwyo.edu>

\* \* Data may not provide a valid measure of conditions

Snowpack values show the most difference comparing central to north-central sections where deficits are evident February 2016, compared to above average in February 2015.

# Seasonal Outlook

## Wyoming Late May Snowpack Comparisons

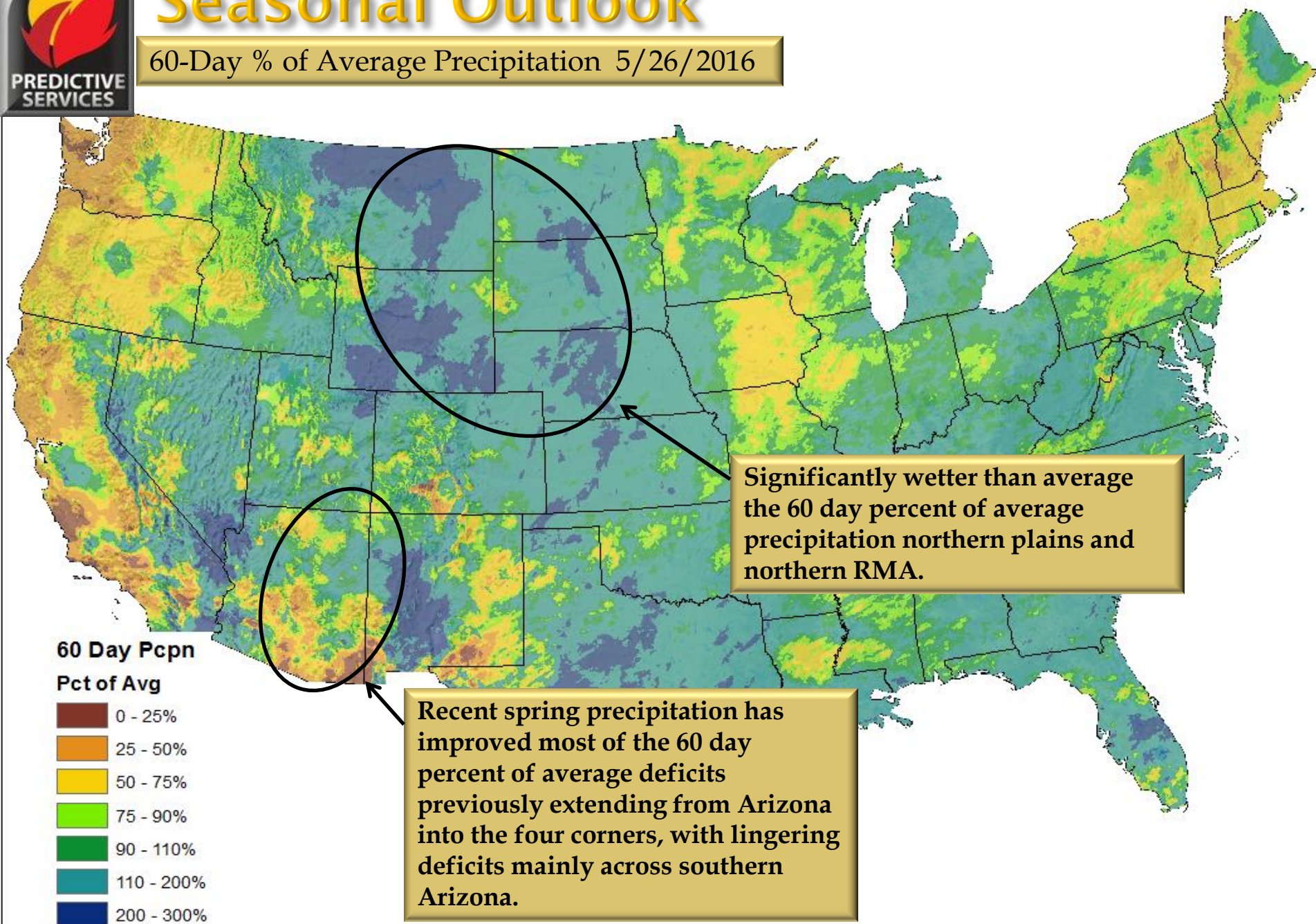


Snowpack values currently greater than this time last year (June 1, 2015 vs. May 26, 2016), except less this year on the east slopes of the north-central Wyoming mountains.



# Seasonal Outlook

60-Day % of Average Precipitation 5/26/2016












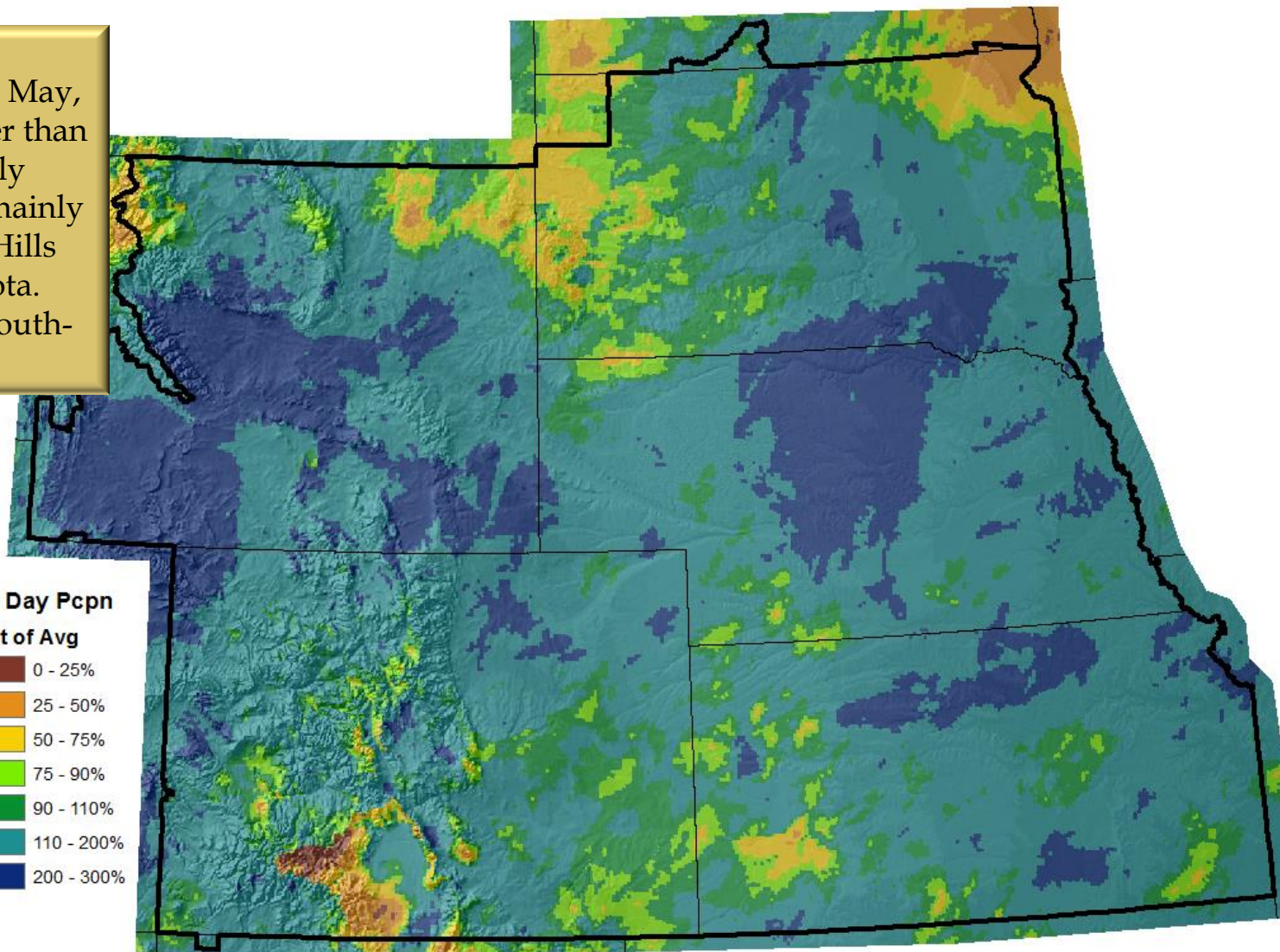
# Seasonal Outlook

30-Day % of Average Precipitation 5/26/2016

Has been significantly wetter than average in May, but with localized drier than average areas (generally 50%-75% of average) mainly in and near the Black Hills of western South Dakota.  
\*Data deficit error in south-central Colorado\*

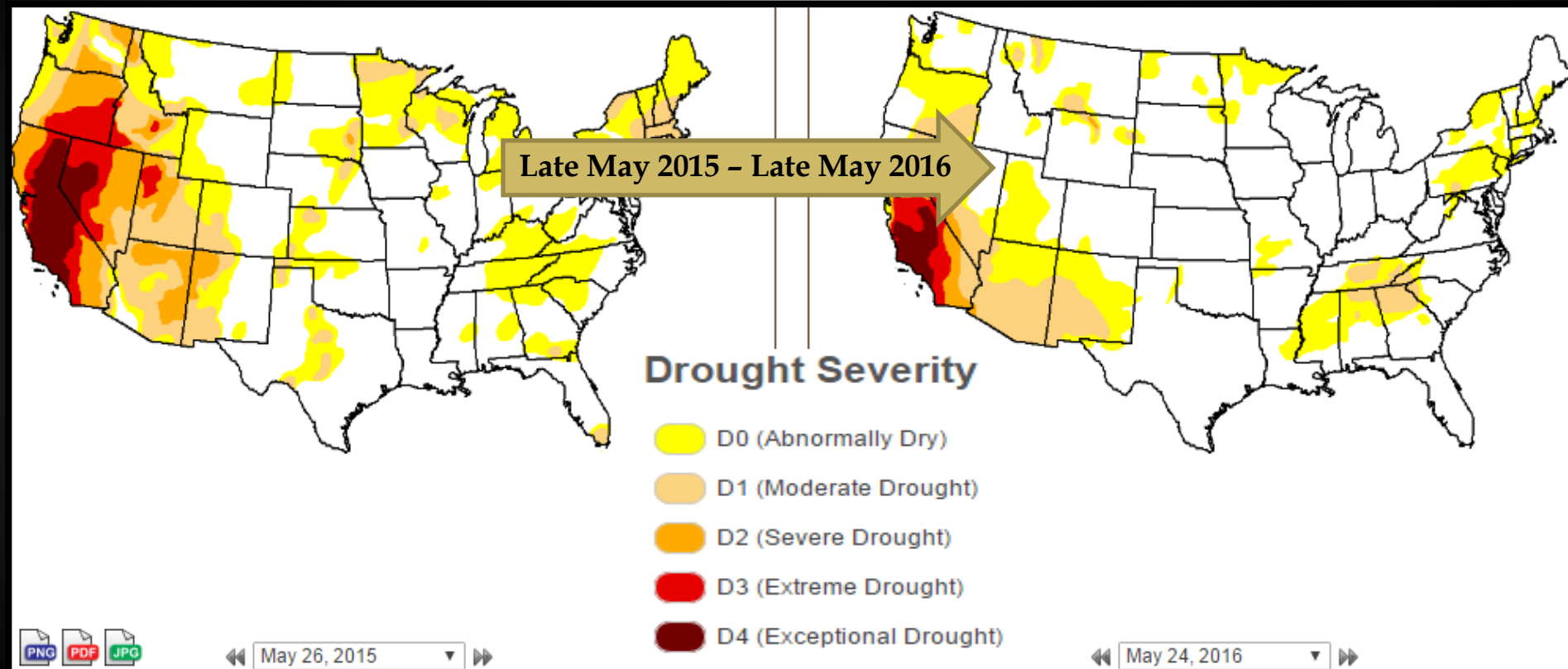
**30 Day Pcpn  
Pct of Avg**

|   |            |
|---|------------|
|   | 0 - 25%    |
|  | 25 - 50%   |
|  | 50 - 75%   |
|  | 75 - 90%   |
|  | 90 - 110%  |
|  | 110 - 200% |
|  | 200 - 300% |



# Seasonal Outlook

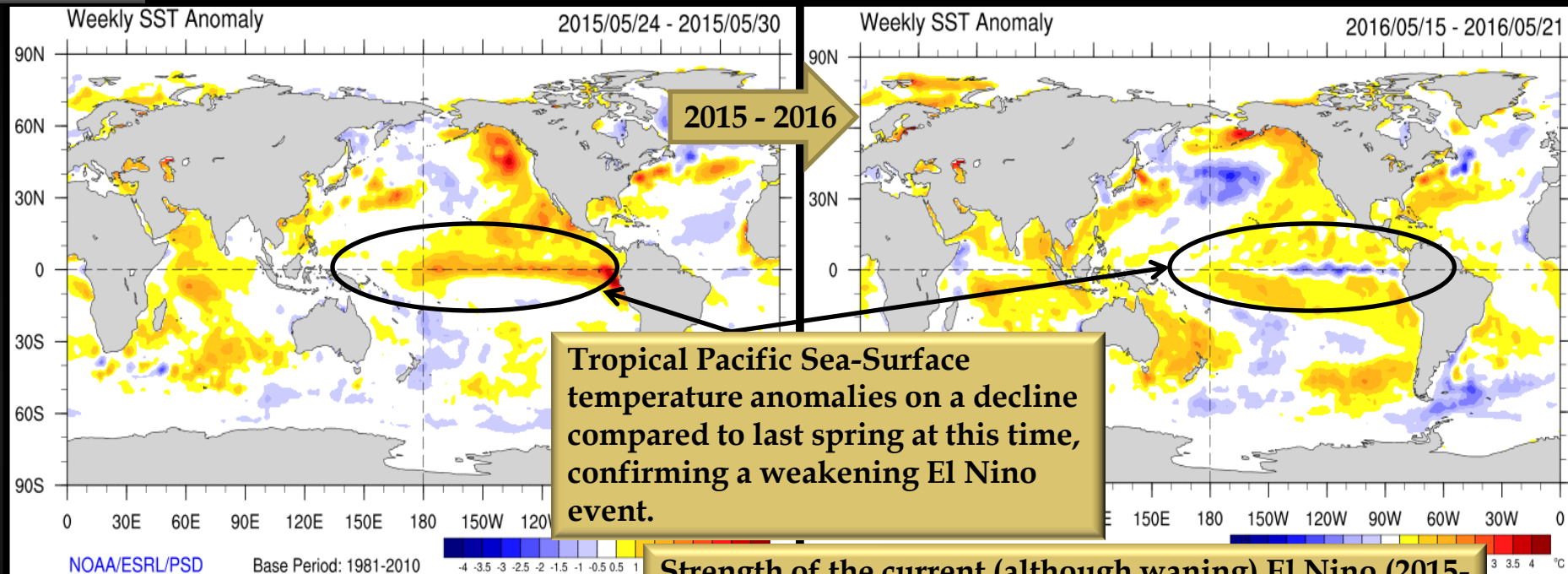
National Drought Monitor  
Late May 2015 vs. Late May 2016



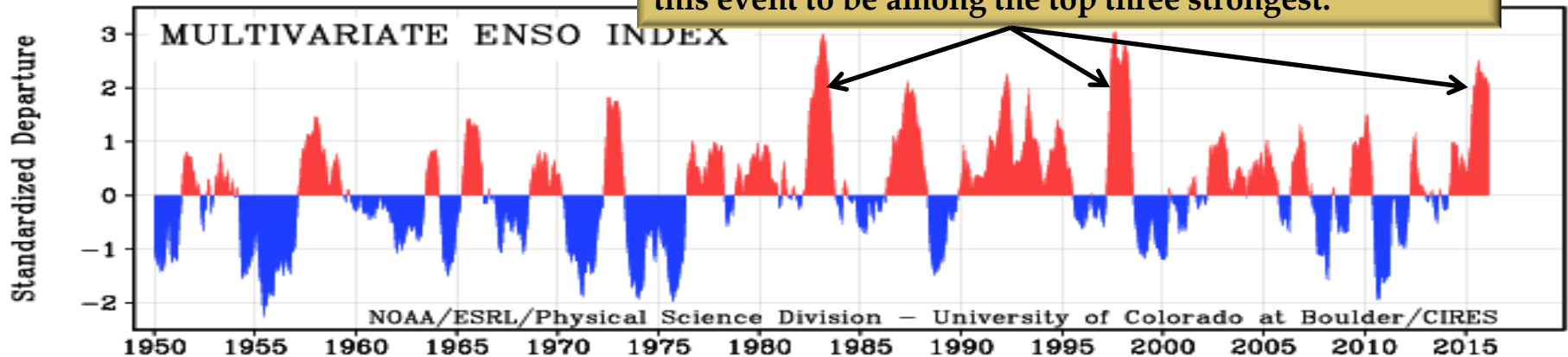
Overall, less drought so far for the RMA in 2016, compared to this time last year. However, drought is lingering over the east slopes of the north-central Wyoming mountains, and has emerged in the southwest Black Hills.

# Seasonal Outlook

## *Sea Surface Temperature Anomalies*



Strength of the current (although waning) El Niño (2015-2016) in comparison to previous years since 1950 shows this event to be among the top three strongest.

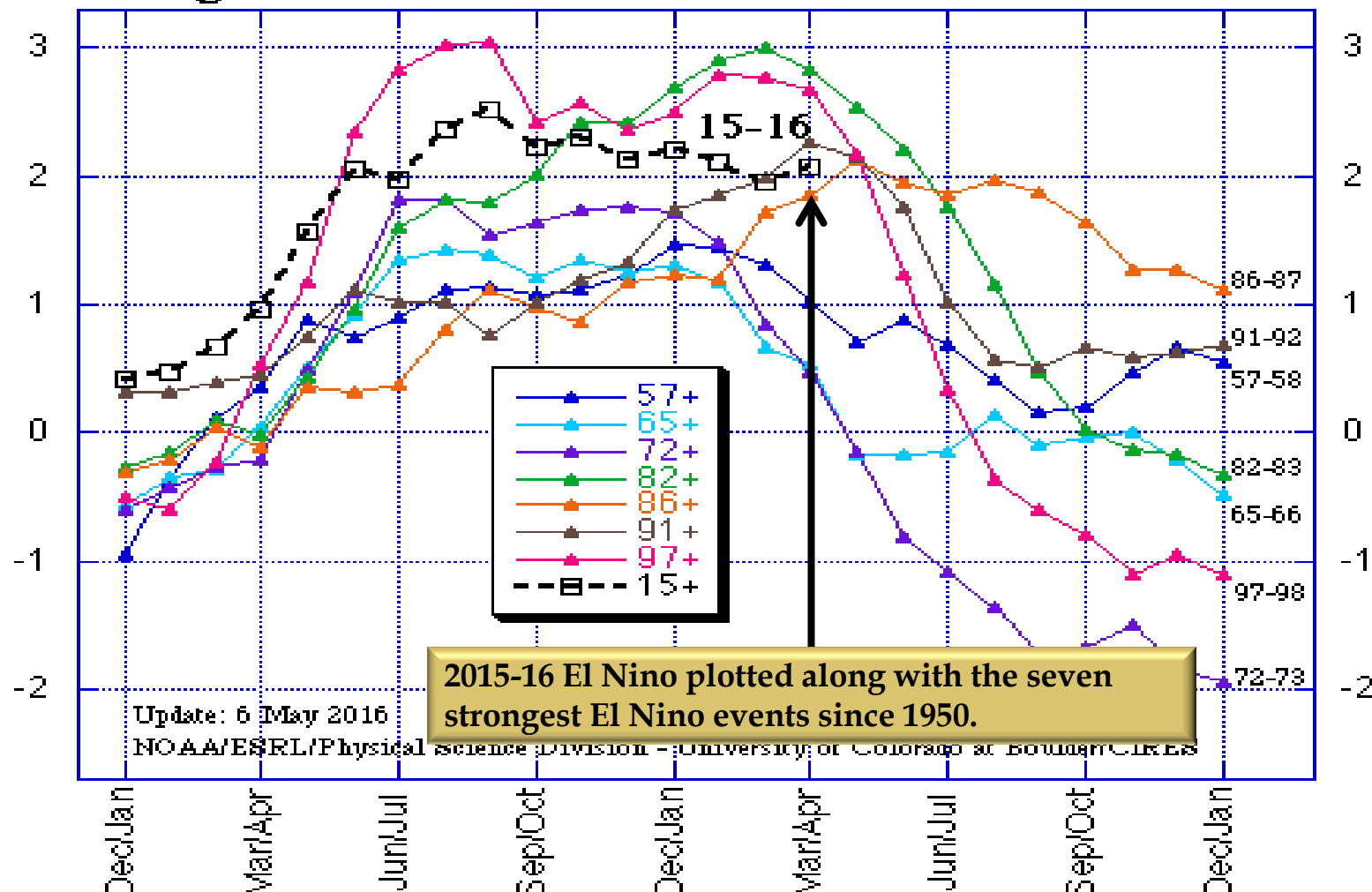


# Seasonal Outlook

*El Nino Southern Oscillation (ENSO) - MEI*

**Multivariate ENSO Index (MEI) for the seven strongest El Niño events since 1950 vs. 2015-16**

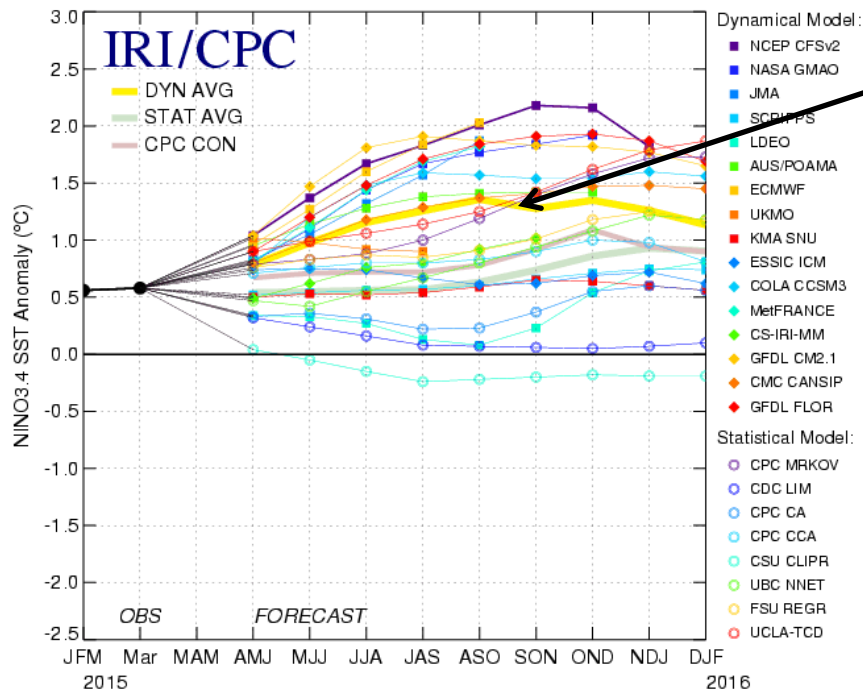
Standardized Departure



# Seasonal Outlook

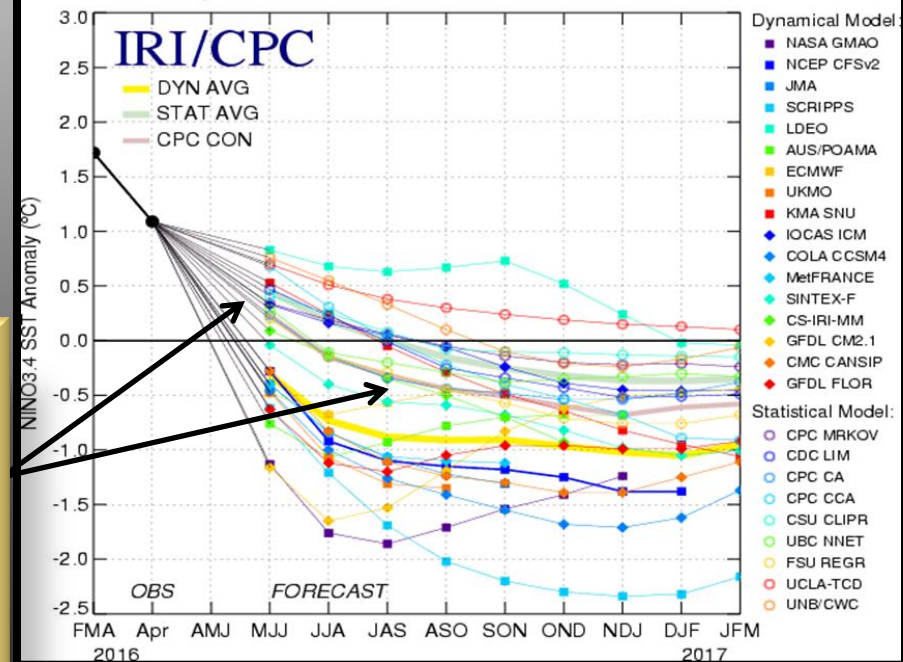
## *El Nino Southern Oscillation (ENSO) Forecast*

Mid-Apr 2015 Plume of Model ENSO Predictions



Most models last year (run April 2015) correctly indicated strengthening El Nino for 2015 and 2016.

Mid-May 2016 Plume of Model ENSO Predictions



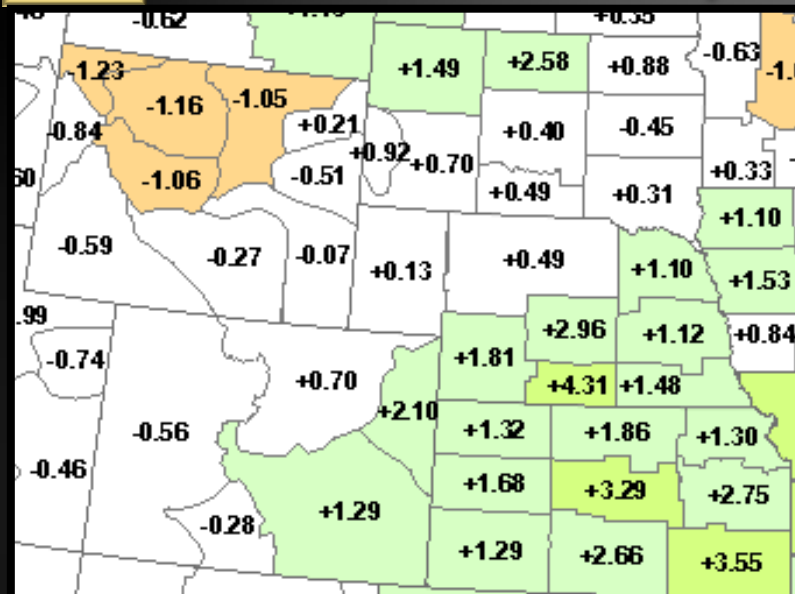
Latest models (run mid-May 2016) show ending El Nino(anomalies less than 0.5 degrees) by early summer 2016, with a neutral to La Nina pattern(less than -0.5 degree anomaly) for much of the summer and fall 2016.

# Seasonal Outlook

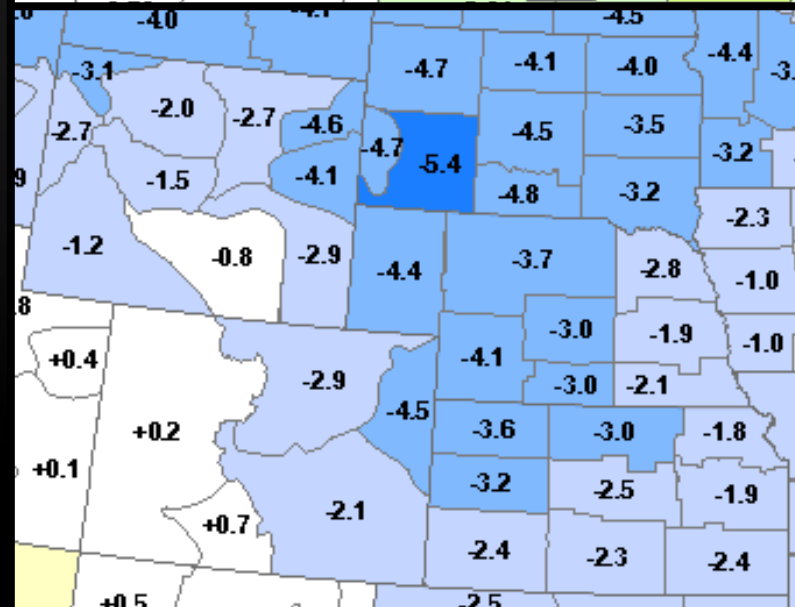
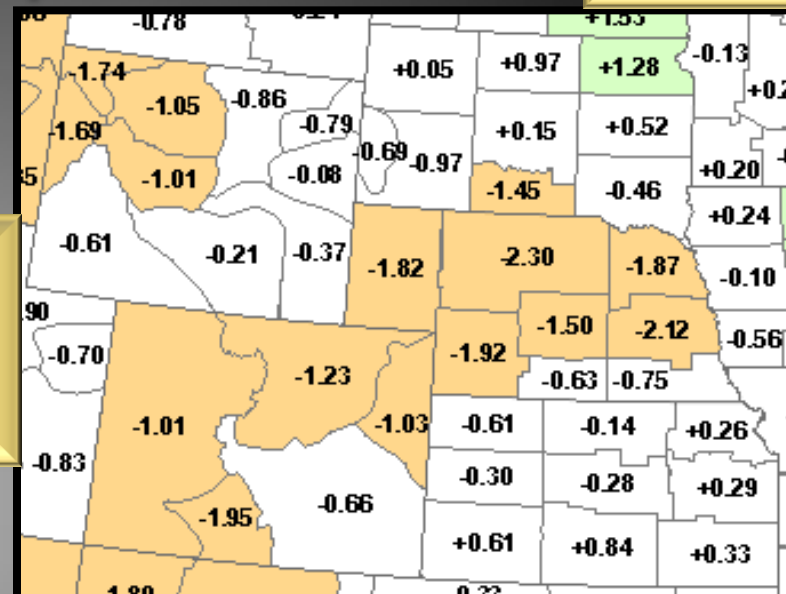
*El Nino Temperature/Precipitation- 1942*

July-  
August

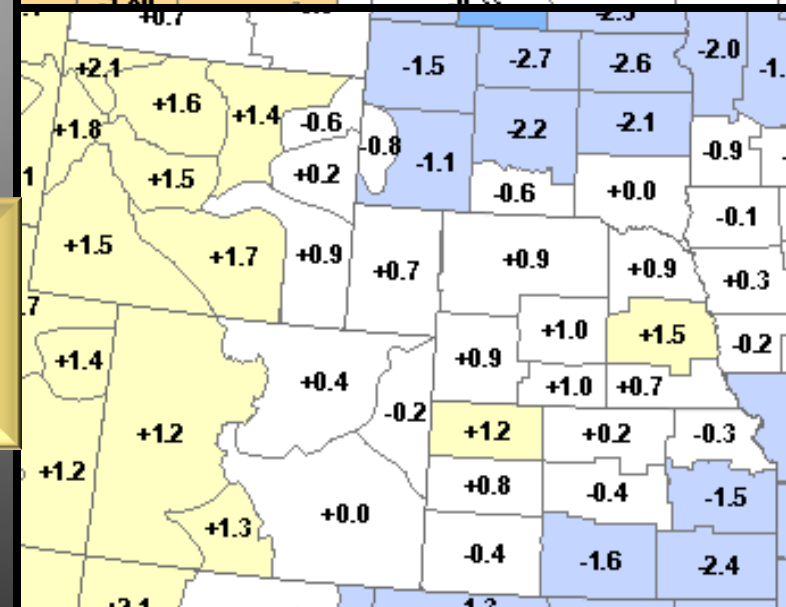
June



*Precipitation  
anomalies El-  
Nino event  
1942*



*Temperature  
anomalies El-  
Nino event  
1942*

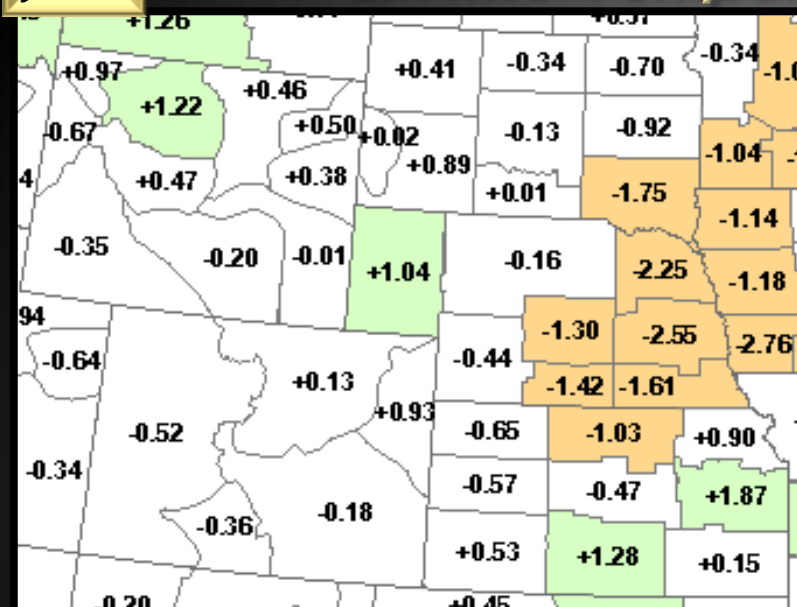


# Seasonal Outlook

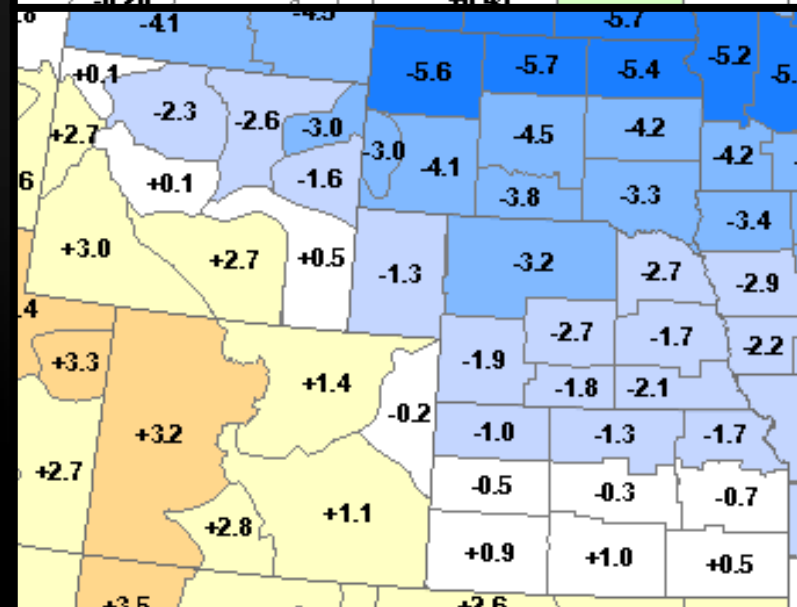
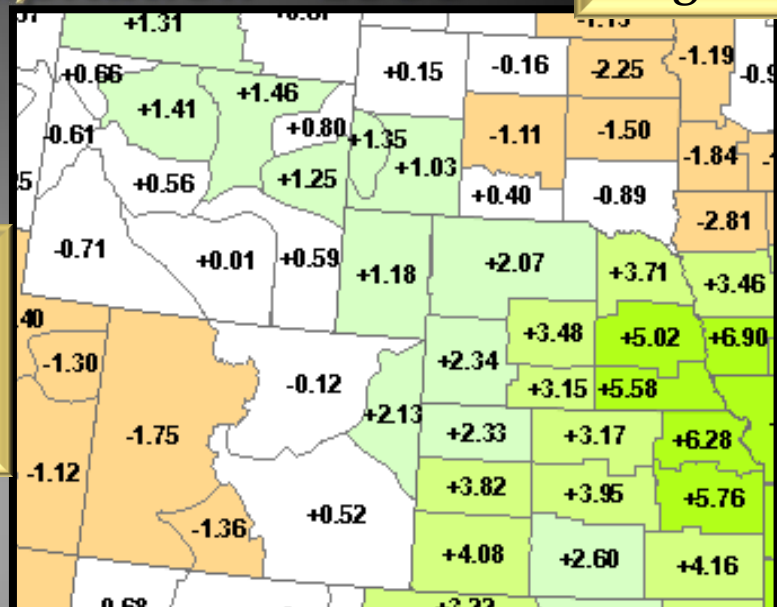
## July- August

# June

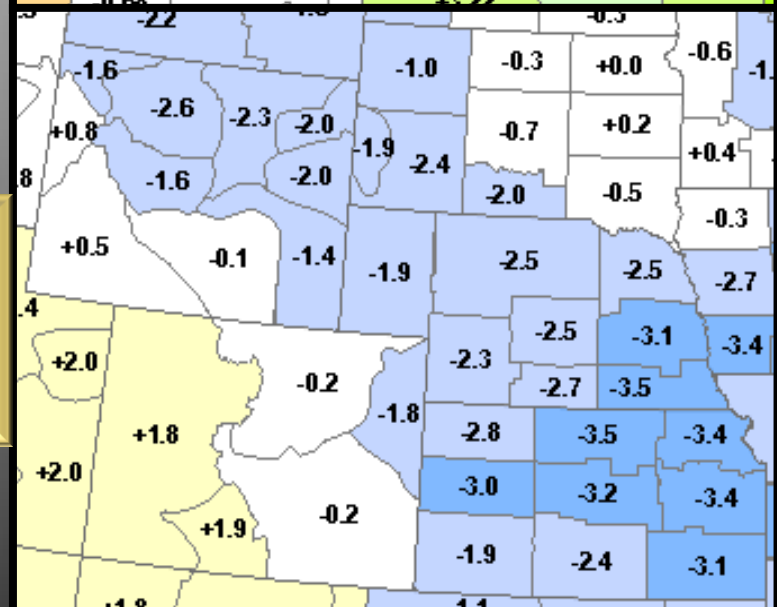
## El Nino Temperature/Precipitation- 1958



*Precipitation  
anomalies El-  
Nino event  
1958*



*Temperature  
anomalies El-  
Nino event  
1958*

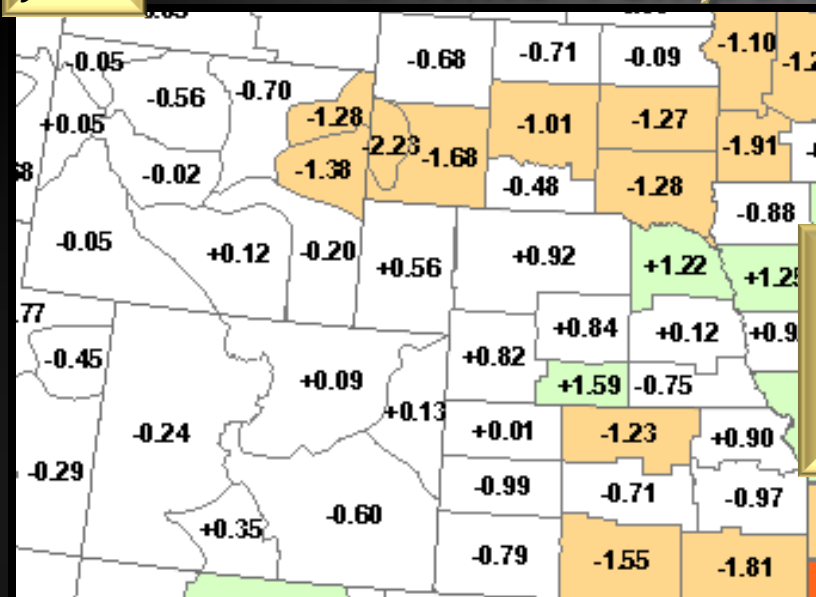


# Seasonal Outlook

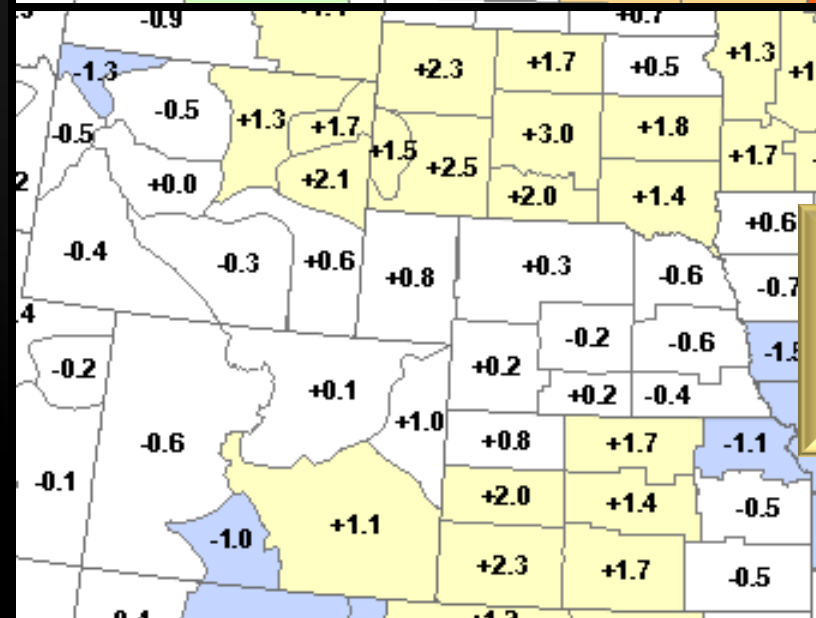
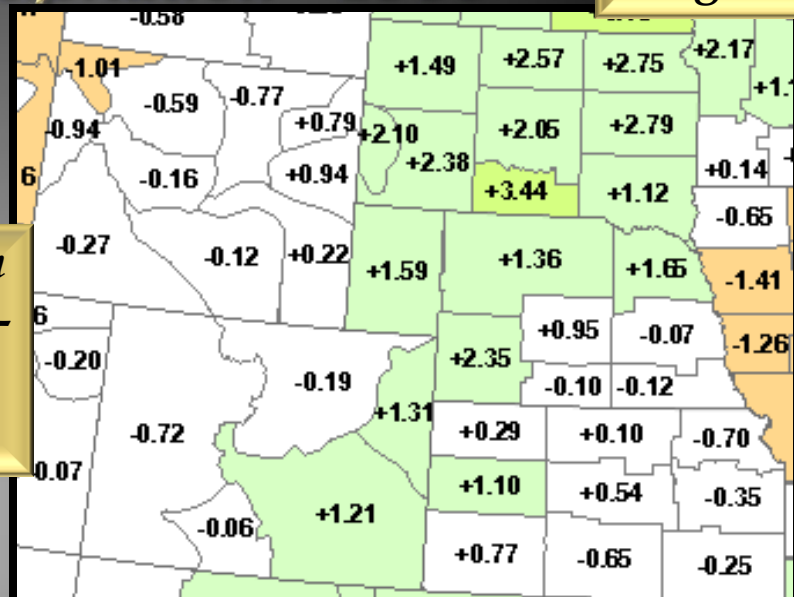
## June

## El Nino Temperature/Precipitation- 1966

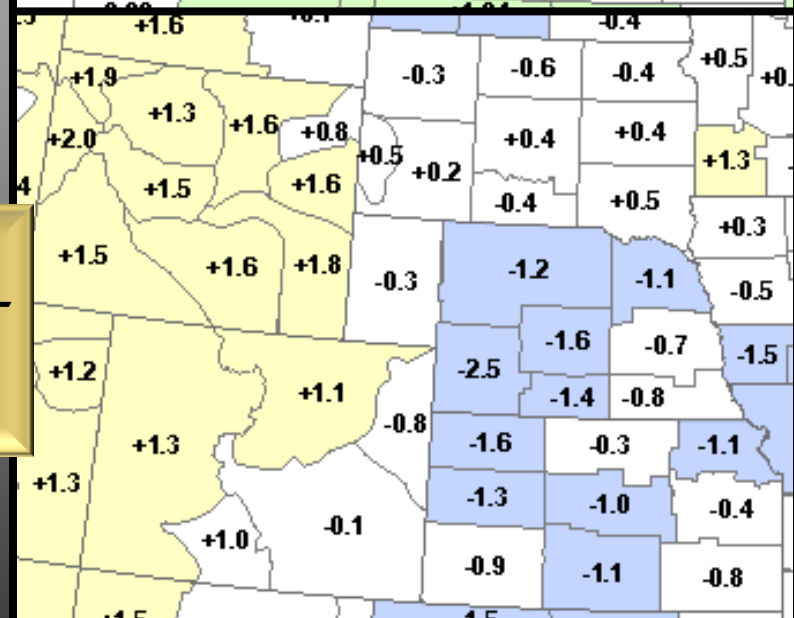
## July- August



*Precipitation  
anomalies El-  
Nino event  
1966*



*Temperature  
anomalies El-  
Nino event  
1966*

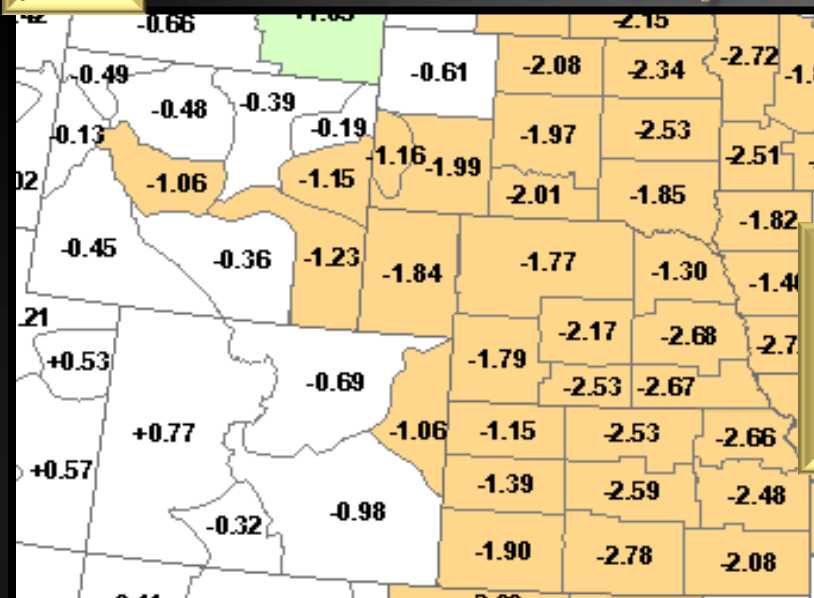


# Seasonal Outlook

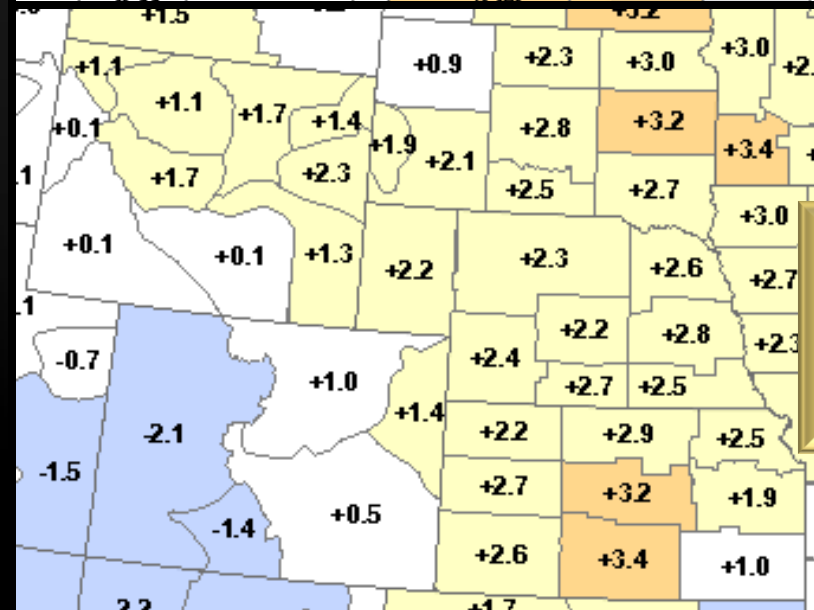
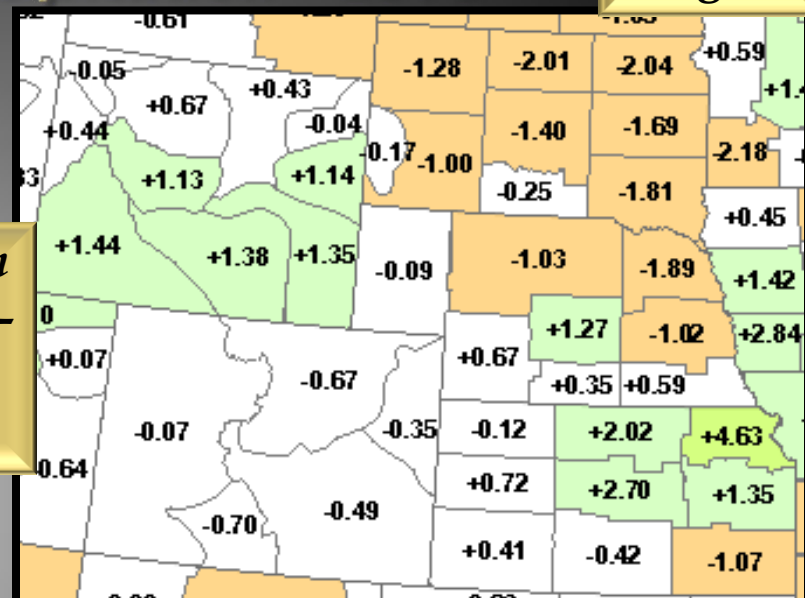
*El Nino Temperature/Precipitation- 1973*

June

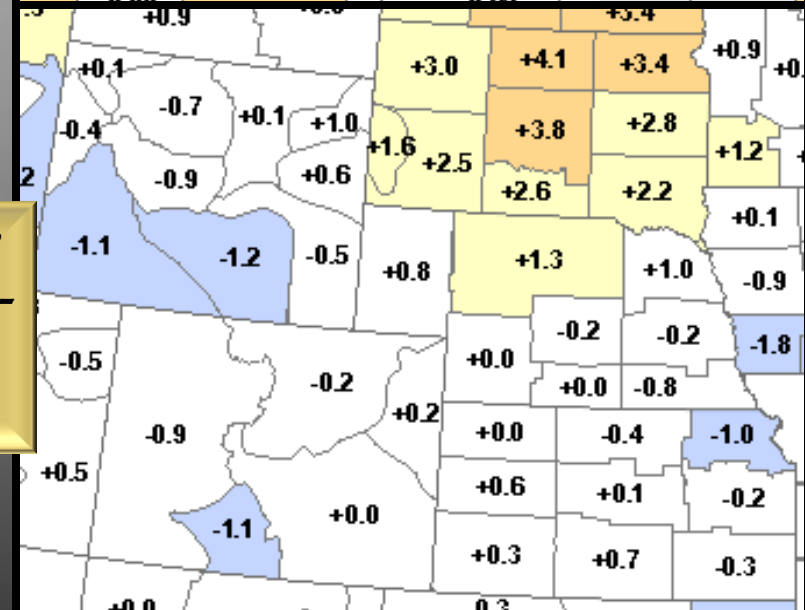
July-August



*Precipitation  
anomalies El-  
Nino event  
1973*



*Temperature  
anomalies El-  
Nino event  
1973*

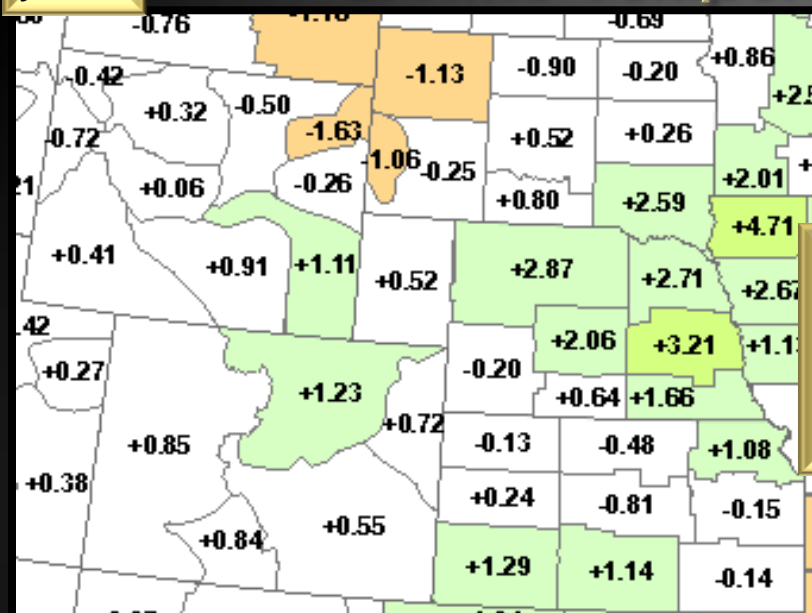


# Seasonal Outlook

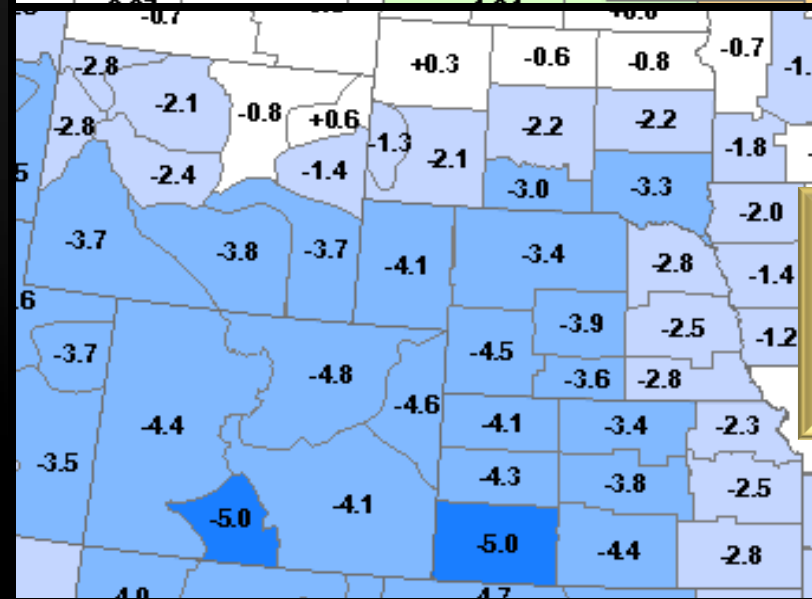
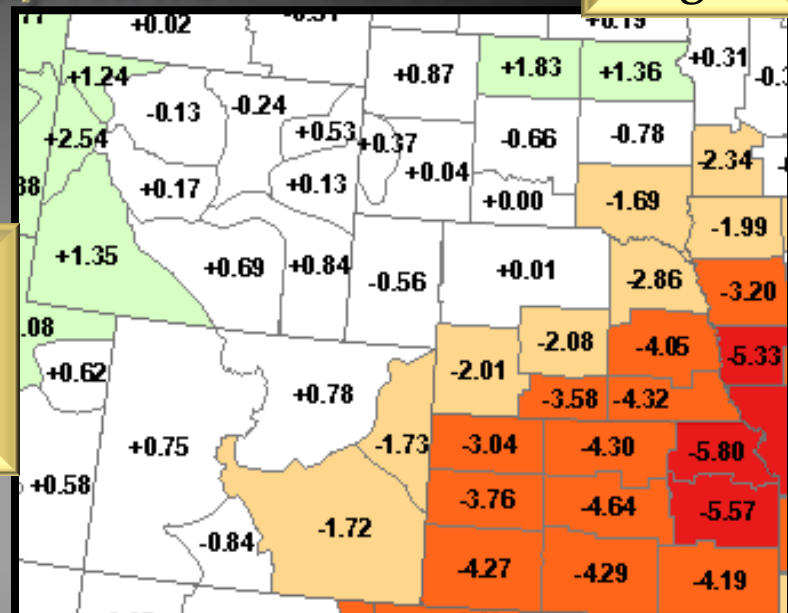
*El Nino Temperature/Precipitation- 1983*

July-August

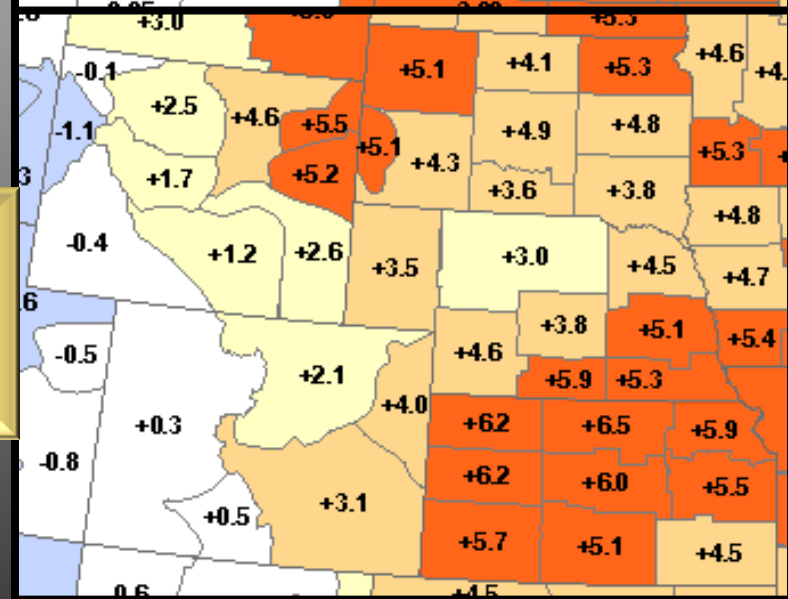
June



*Precipitation  
anomalies El-  
Nino event  
1983*



*Temperature  
anomalies El-  
Nino event  
1983*

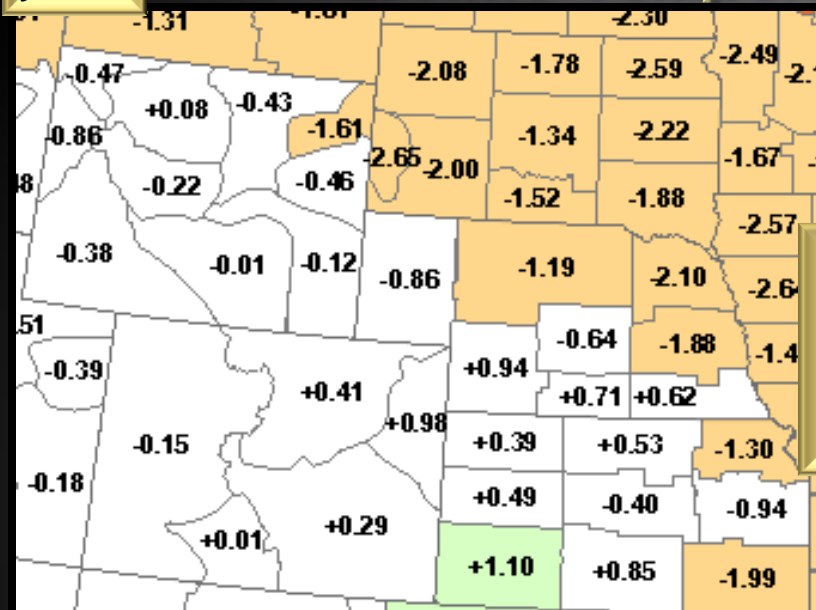


# Seasonal Outlook

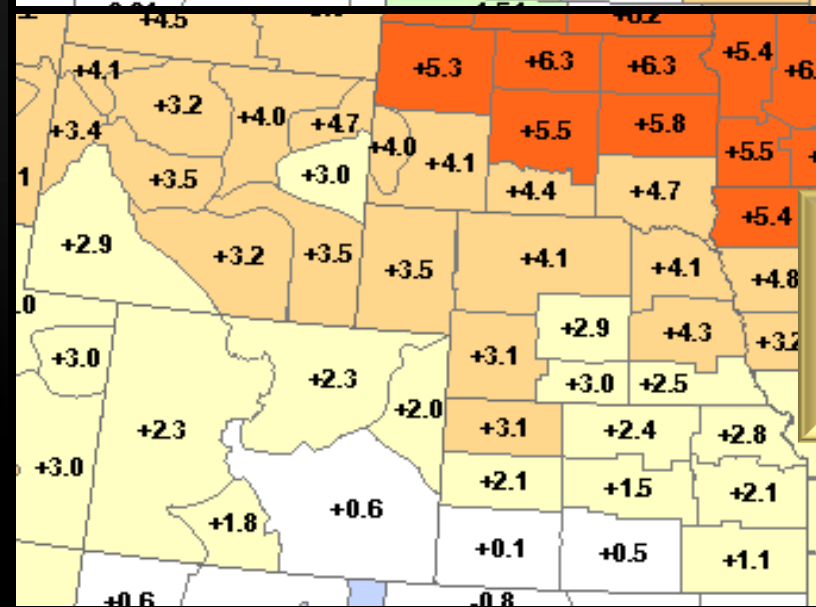
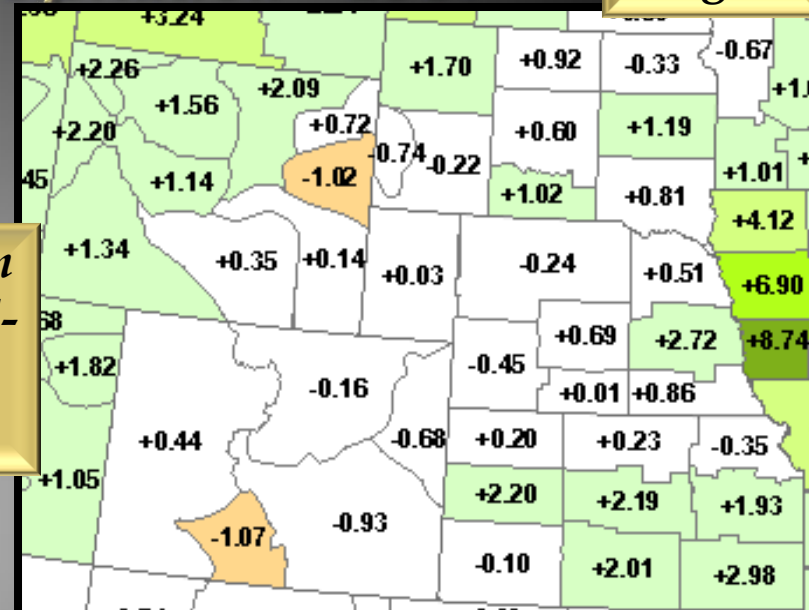
*El Nino Temperature/Precipitation- 1987*

July-August

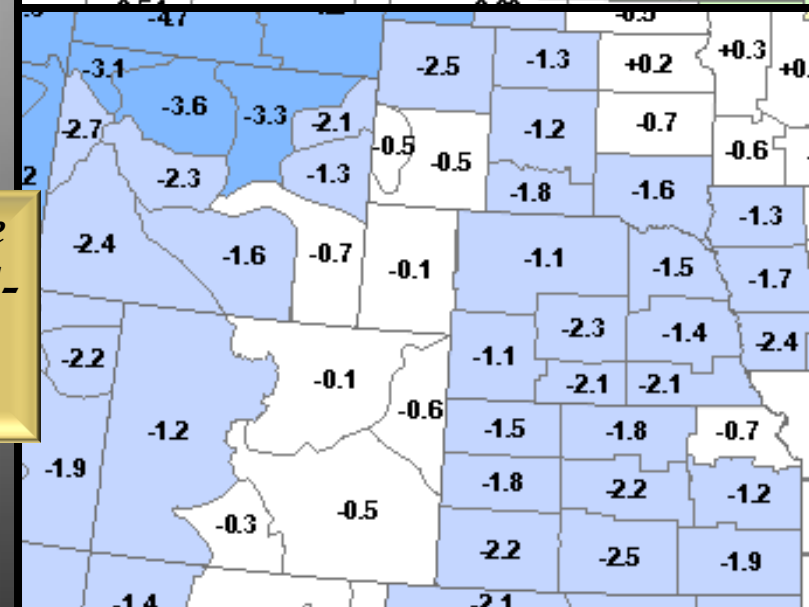
June



*Precipitation  
anomalies El-  
Nino event  
1987*



*Temperature  
anomalies El-  
Nino event  
1987*

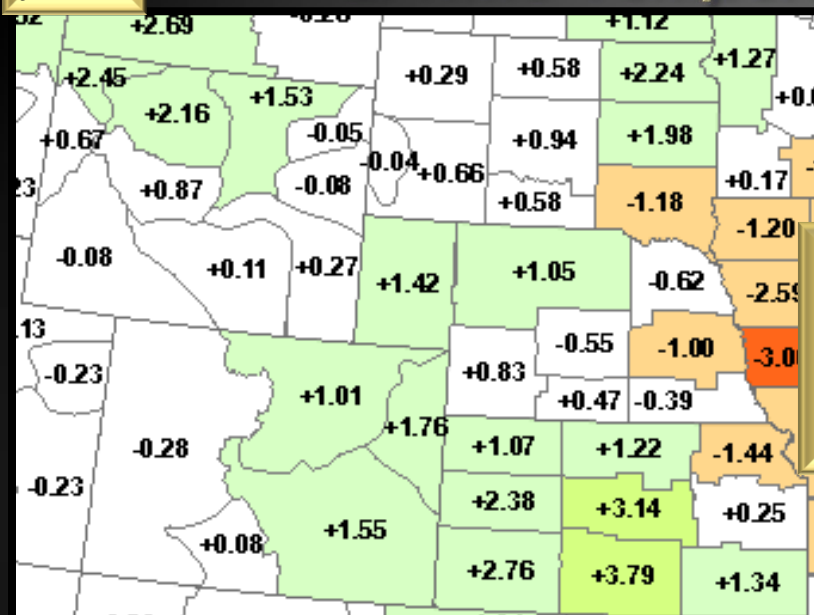


# Seasonal Outlook

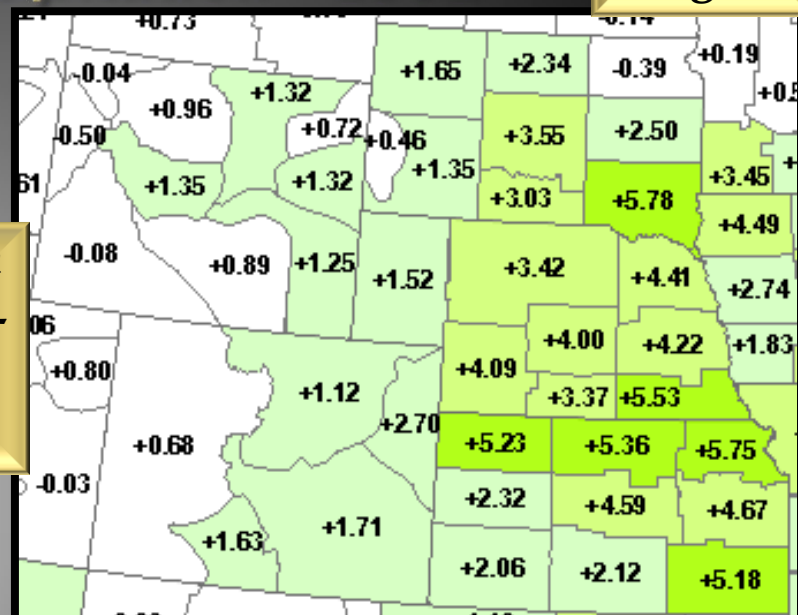
*El Nino Temperature/Precipitation- 1992*

July-  
August

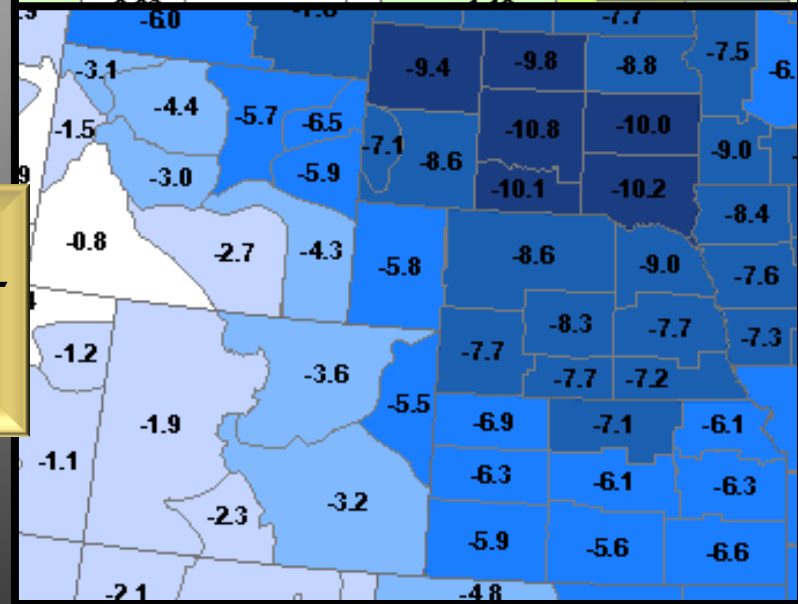
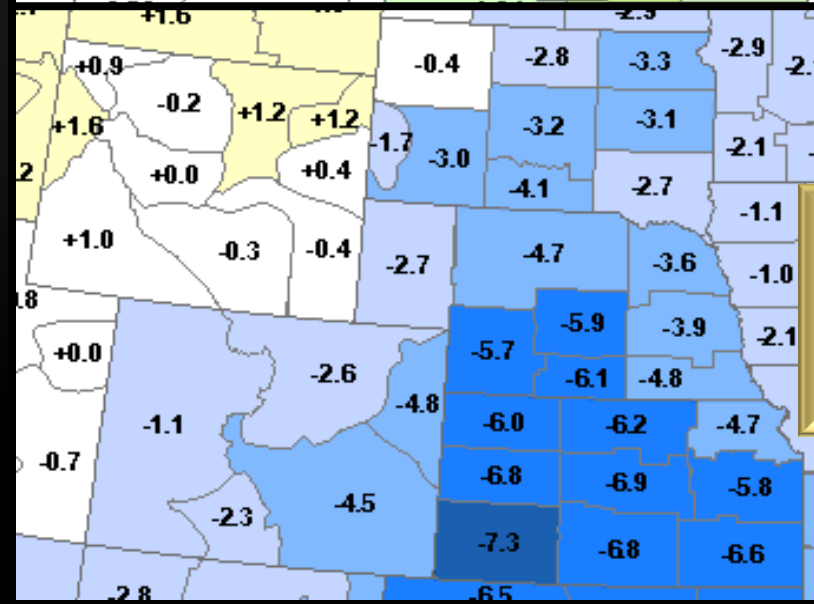
June



*Precipitation  
anomalies El-  
Nino event  
1992*



*Temperature  
anomalies El-  
Nino event  
1992*

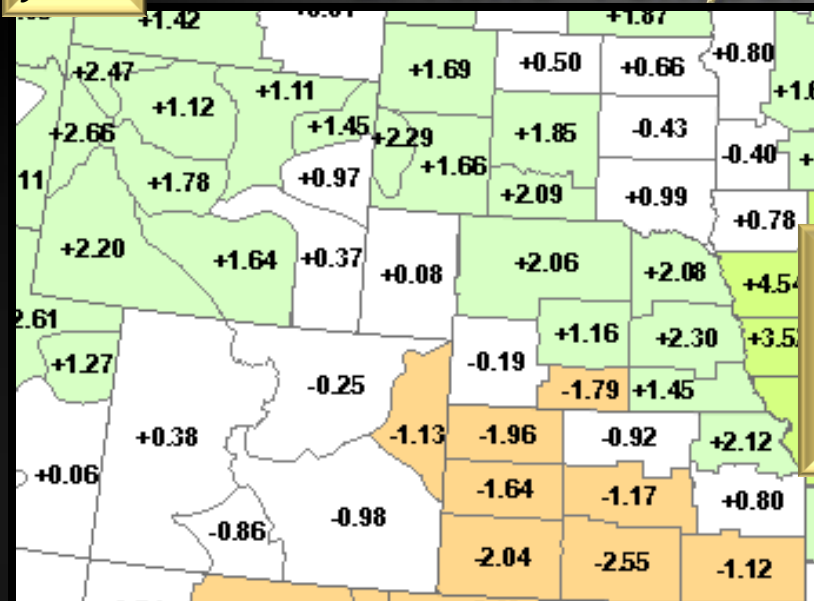


# Seasonal Outlook

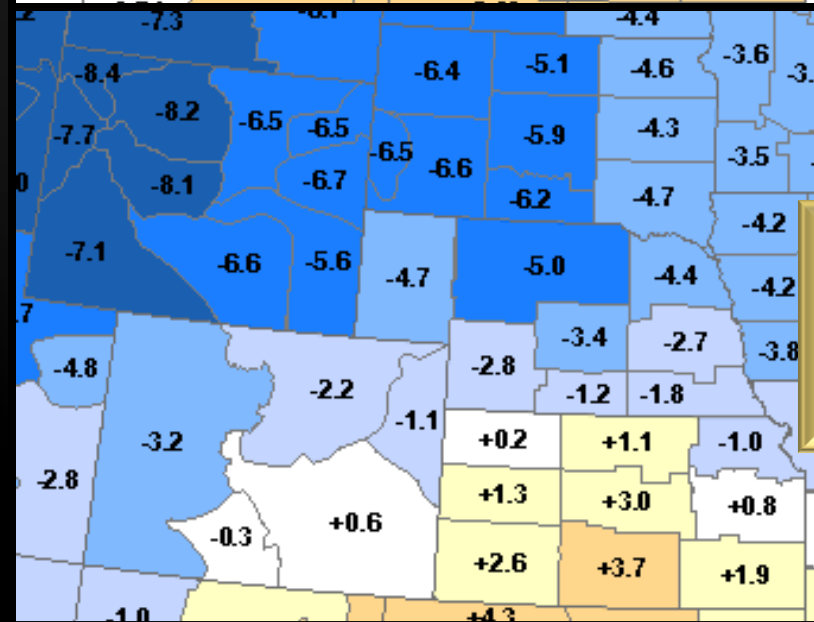
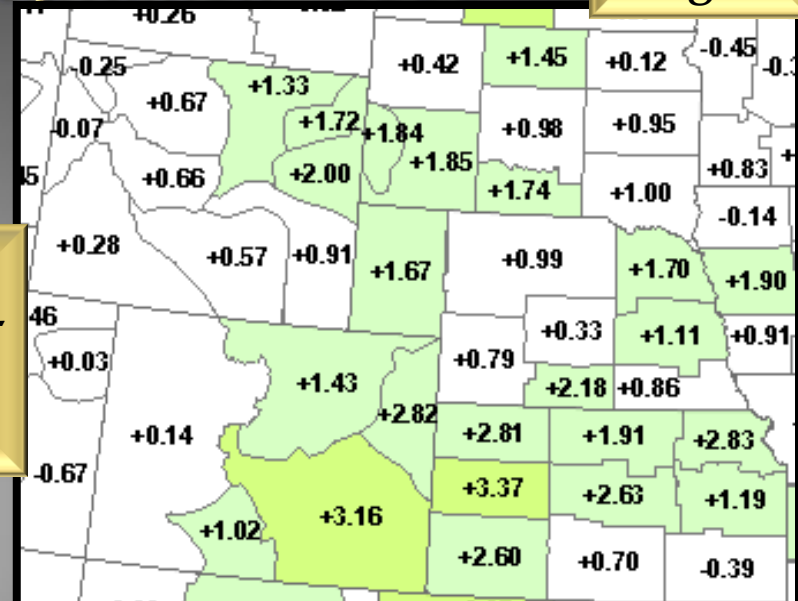
## July- August

# June

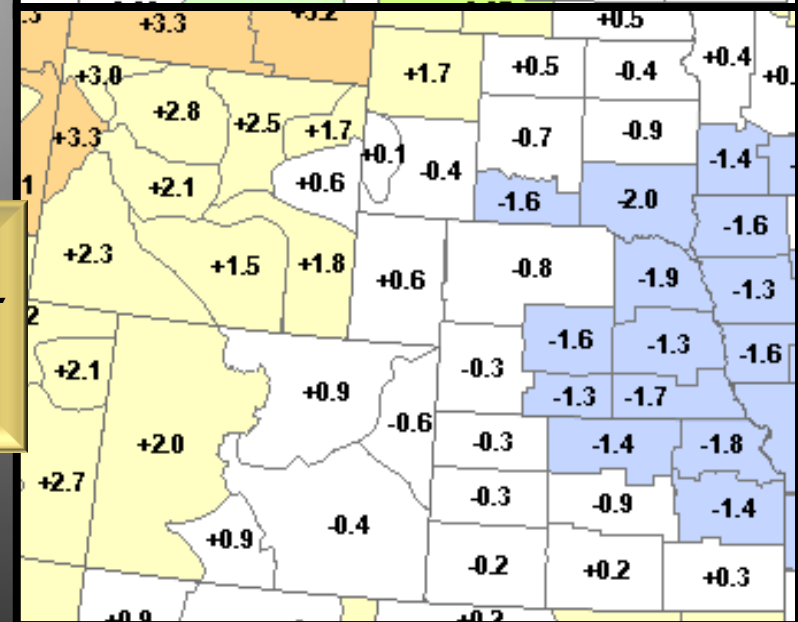
## El Nino Temperature/Precipitation- 1998



*Precipitation  
anomalies El-  
Nino event  
1998*



*Temperature  
anomalies El-  
Nino event  
1998*



# Seasonal Outlook

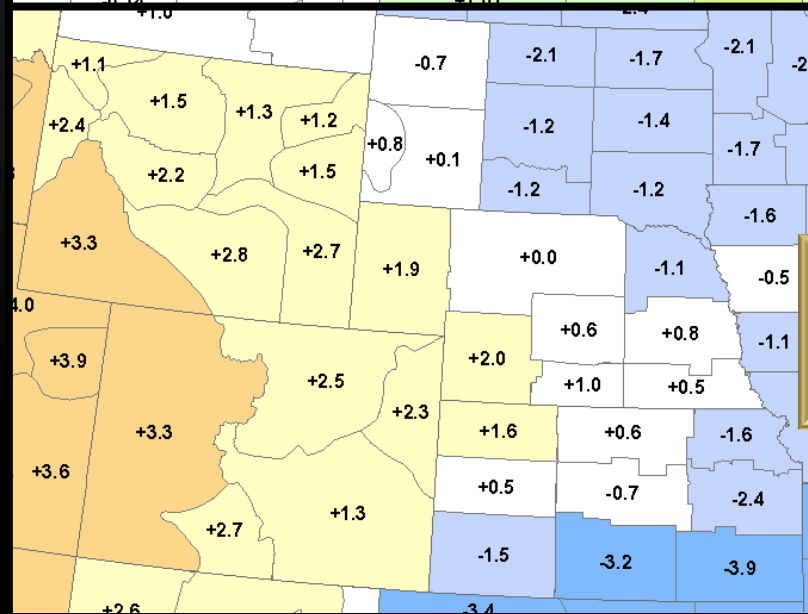
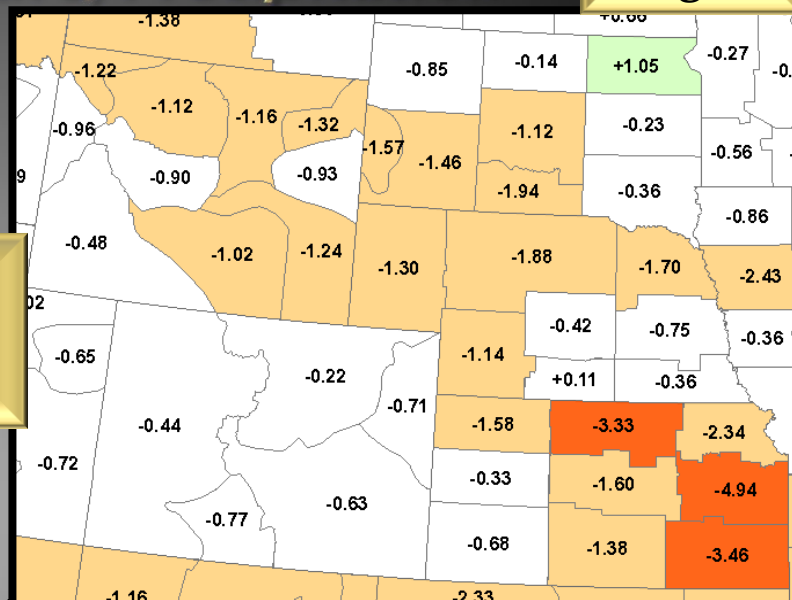
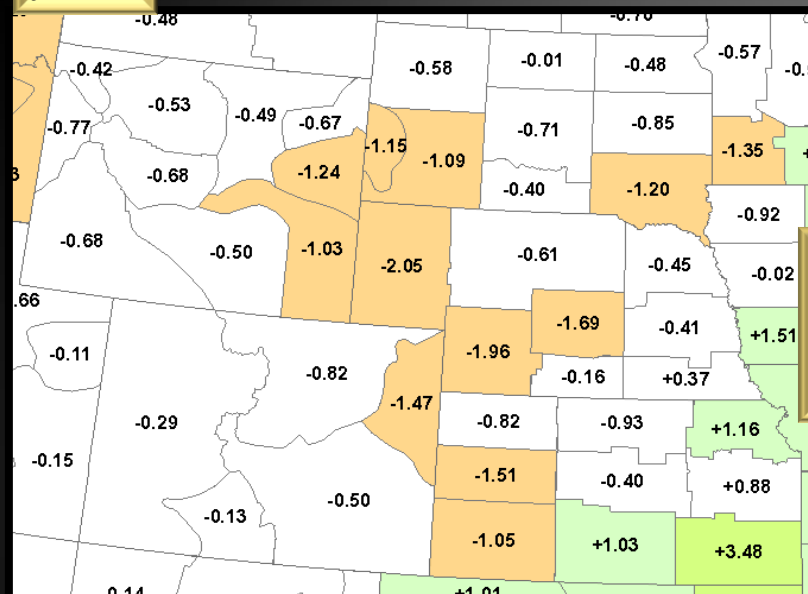
July-  
August

June

*Active Fire Years – Temperature/Precipitation*

Precipitation  
Anomalies  
2000

Temperature  
Anomalies  
2000



# Seasonal Outlook

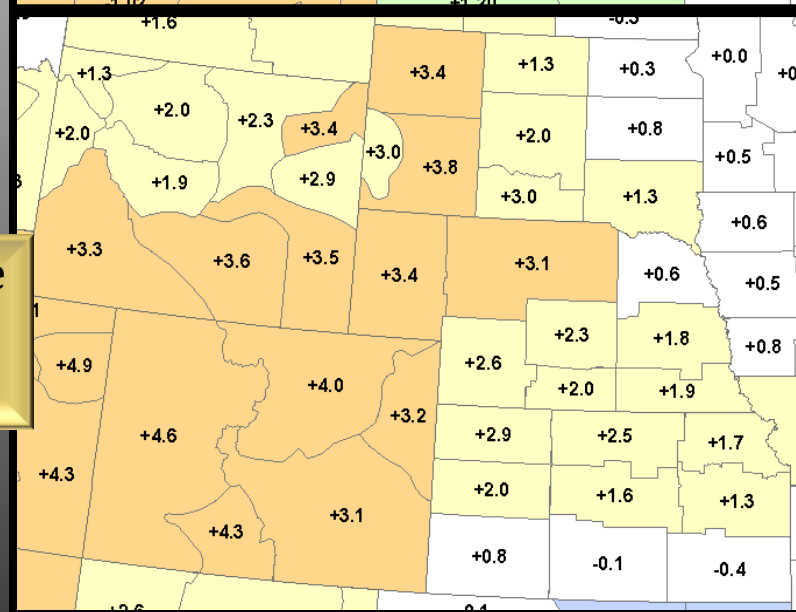
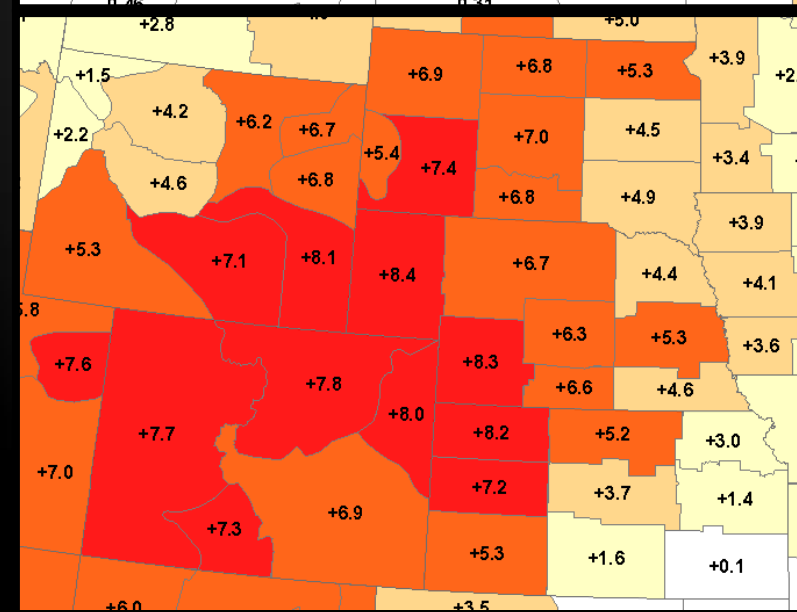
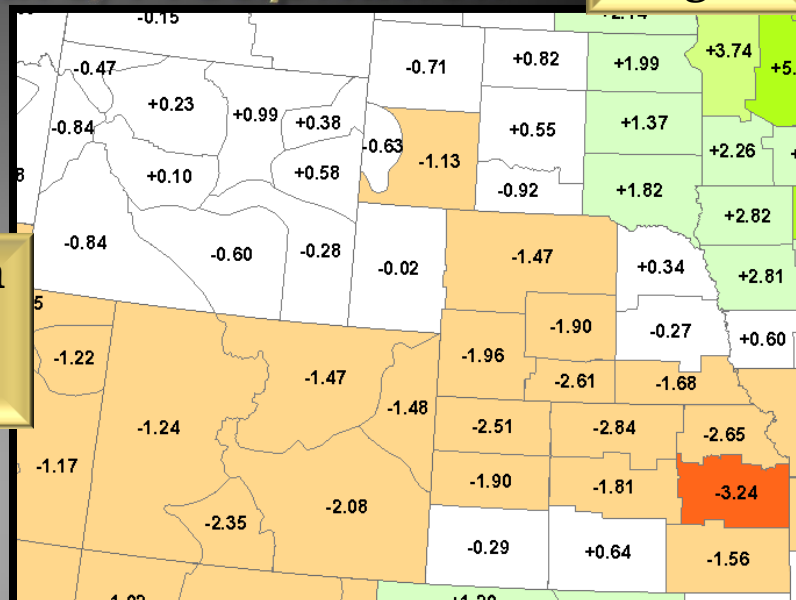
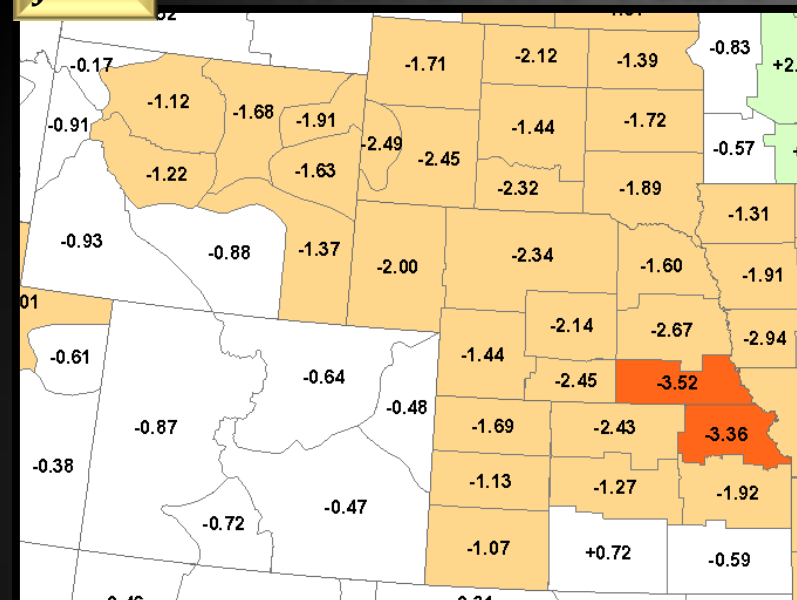
July-  
August

June

*Active Fire Years - Temperature/Precipitation*

Precipitation  
Anomalies  
2002

Temperature  
Anomalies  
2002



# Seasonal Outlook

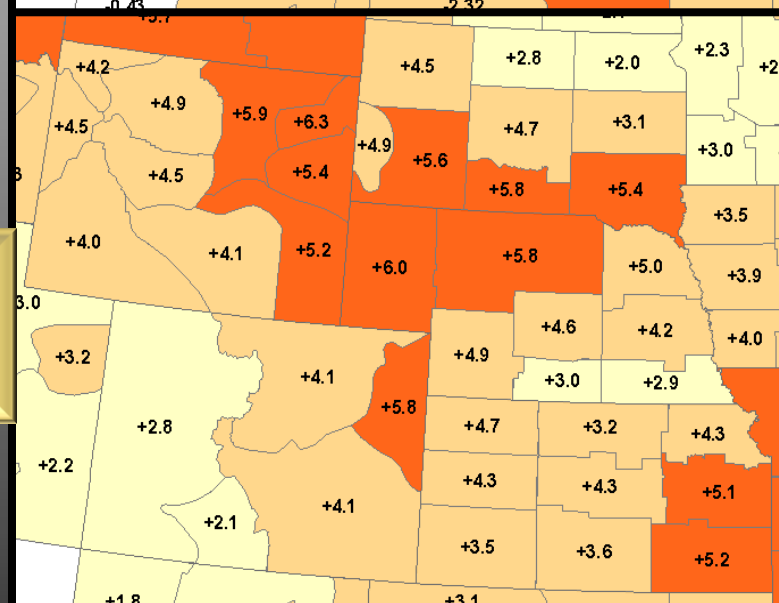
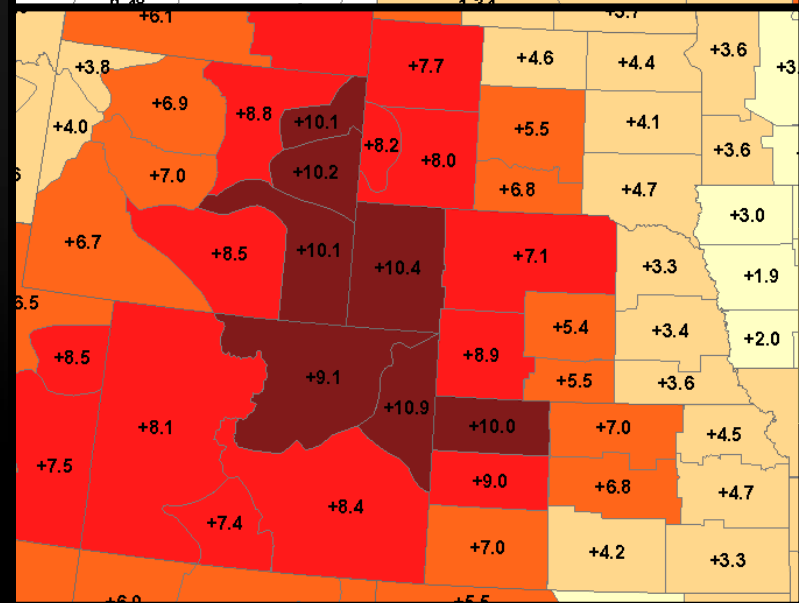
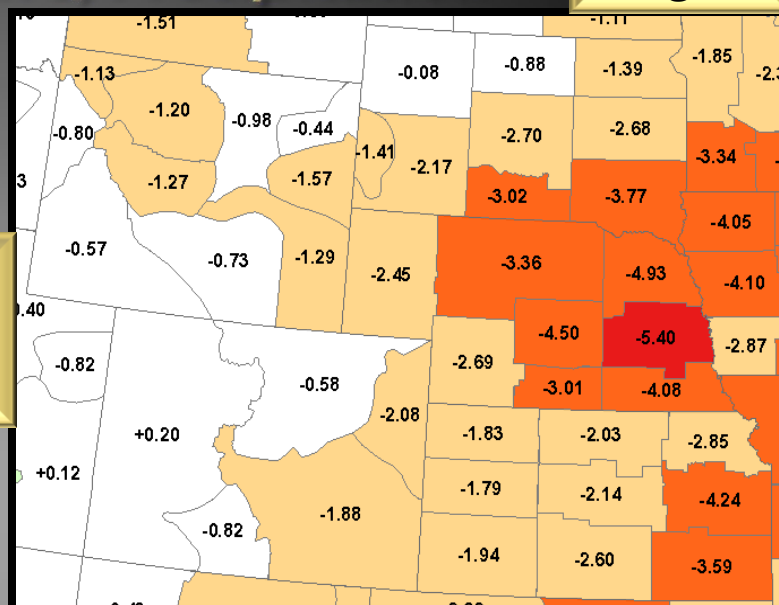
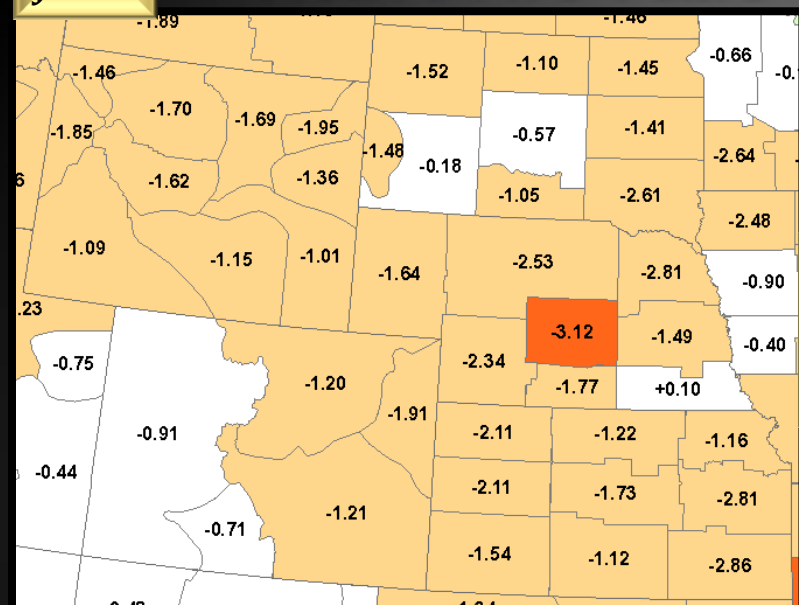
July-  
August

June

*Active Fire Years – Temperature/Precipitation*

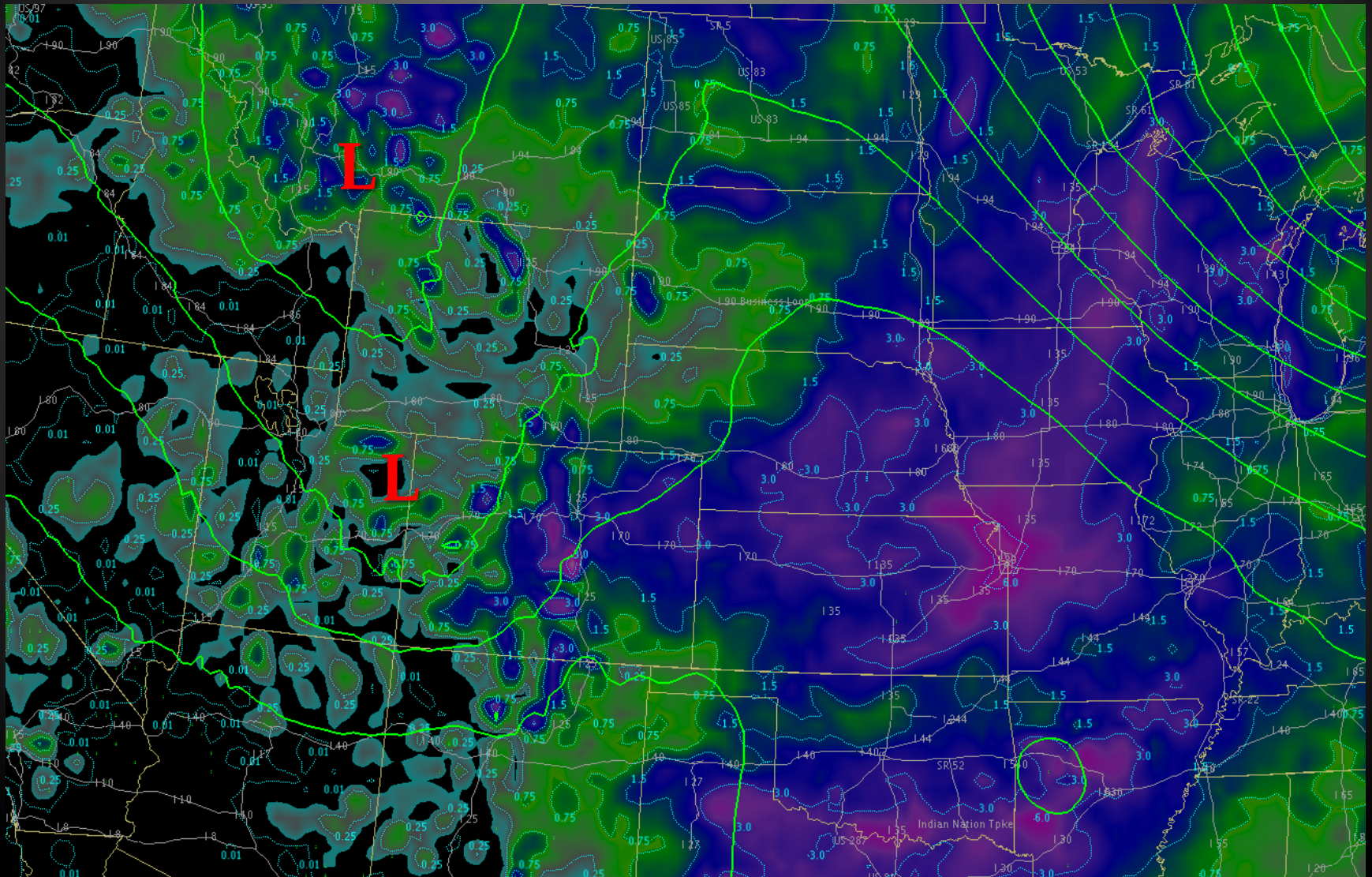
Precipitation  
Anomalies  
2012

Temperature  
Anomalies  
2012



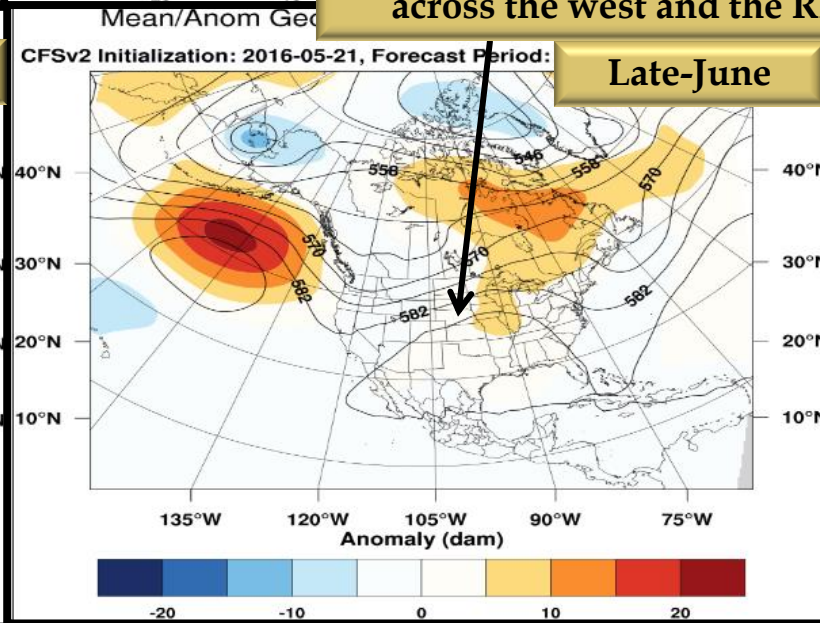
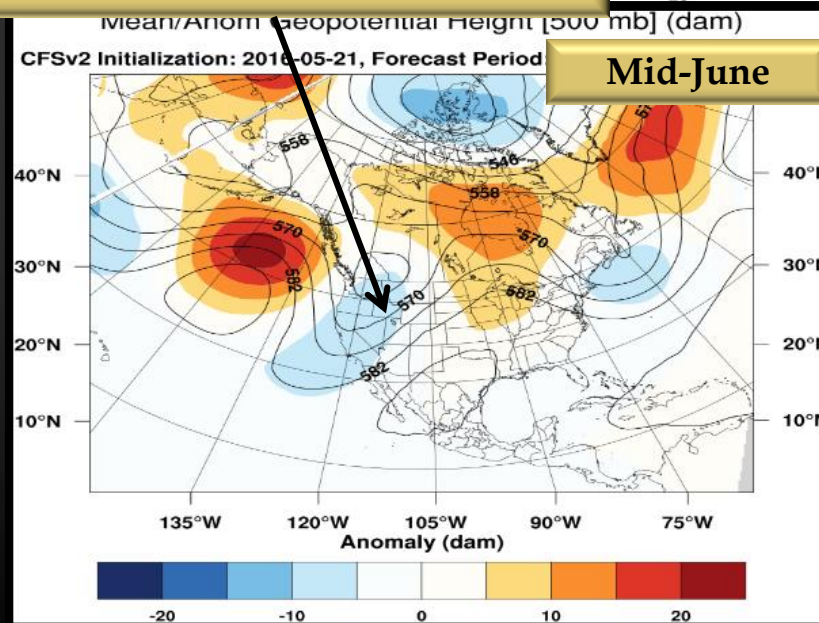
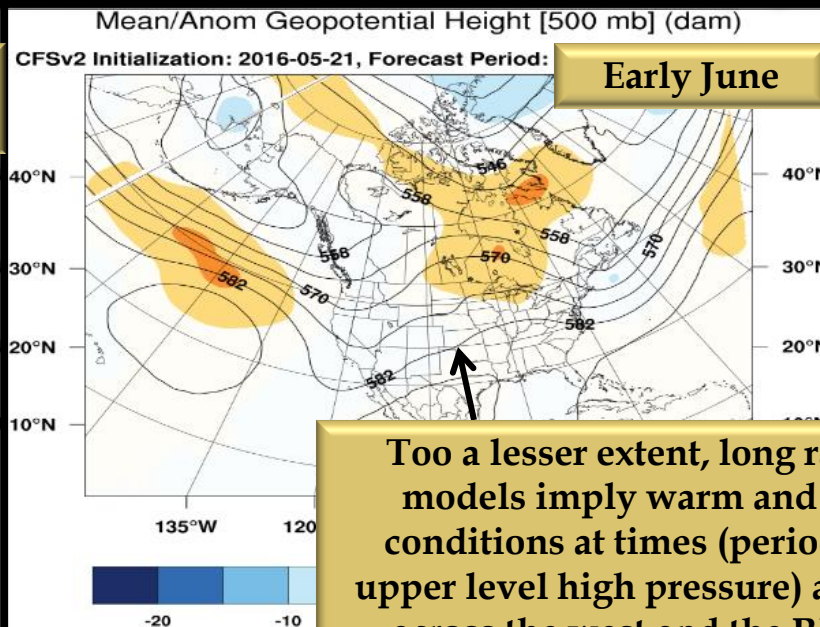
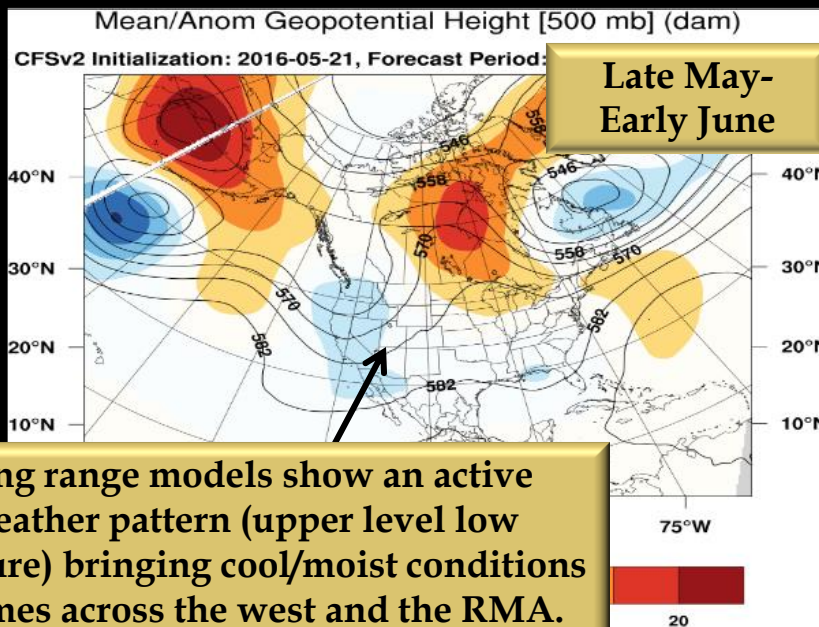
# Seasonal Outlook– Short-Term

Forecast precipitation through Saturday June 4<sup>th</sup> indicates an active pattern with showers and beneficial moisture across a large portion of the RMA. The greatest amounts are focused east of the continental divide (amounts in inches and tenths of an inch).



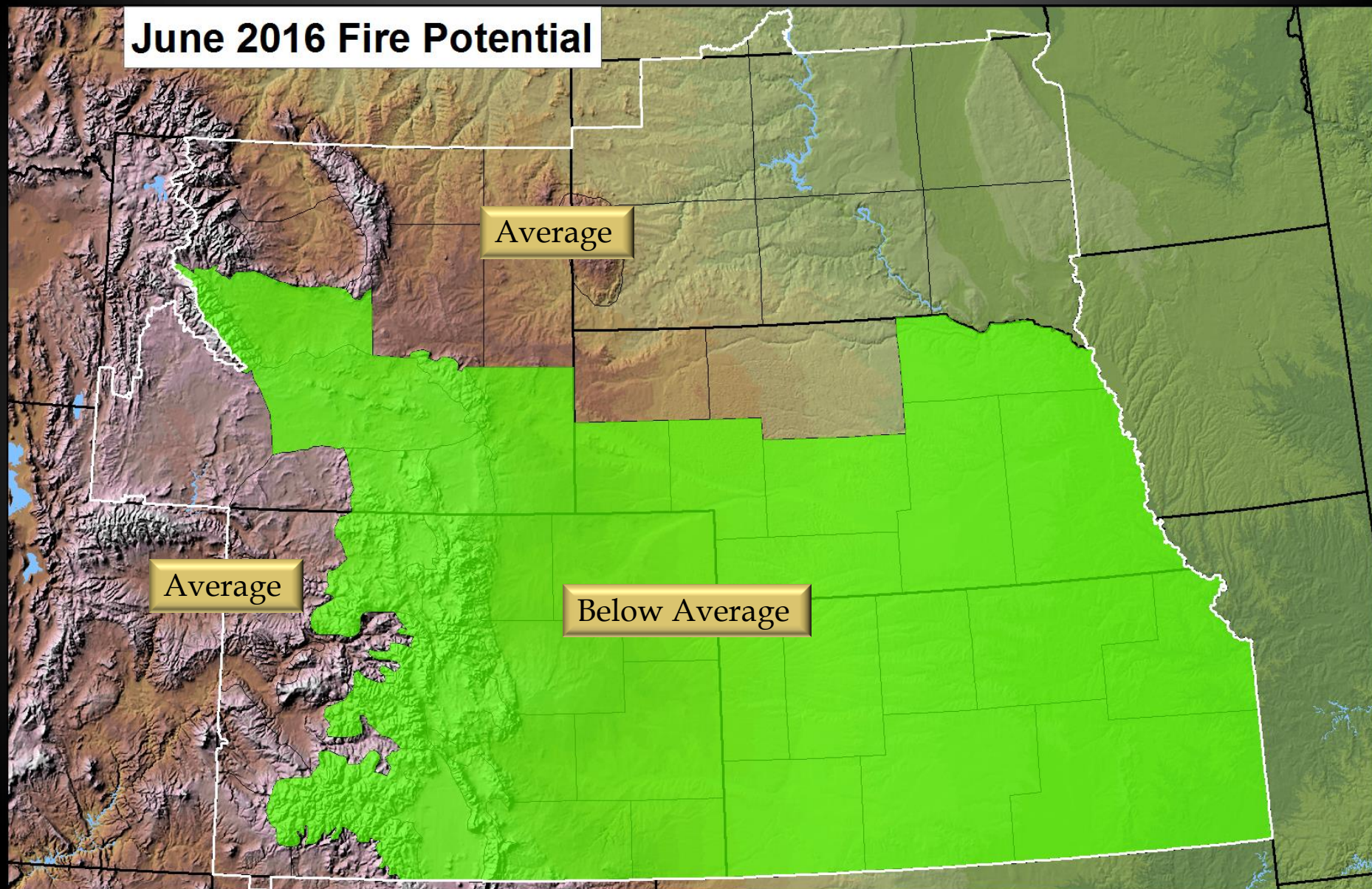
# Seasonal Outlook

## Pressure Patterns Late May-June



# Seasonal Outlook

**June 2016 Fire Potential**



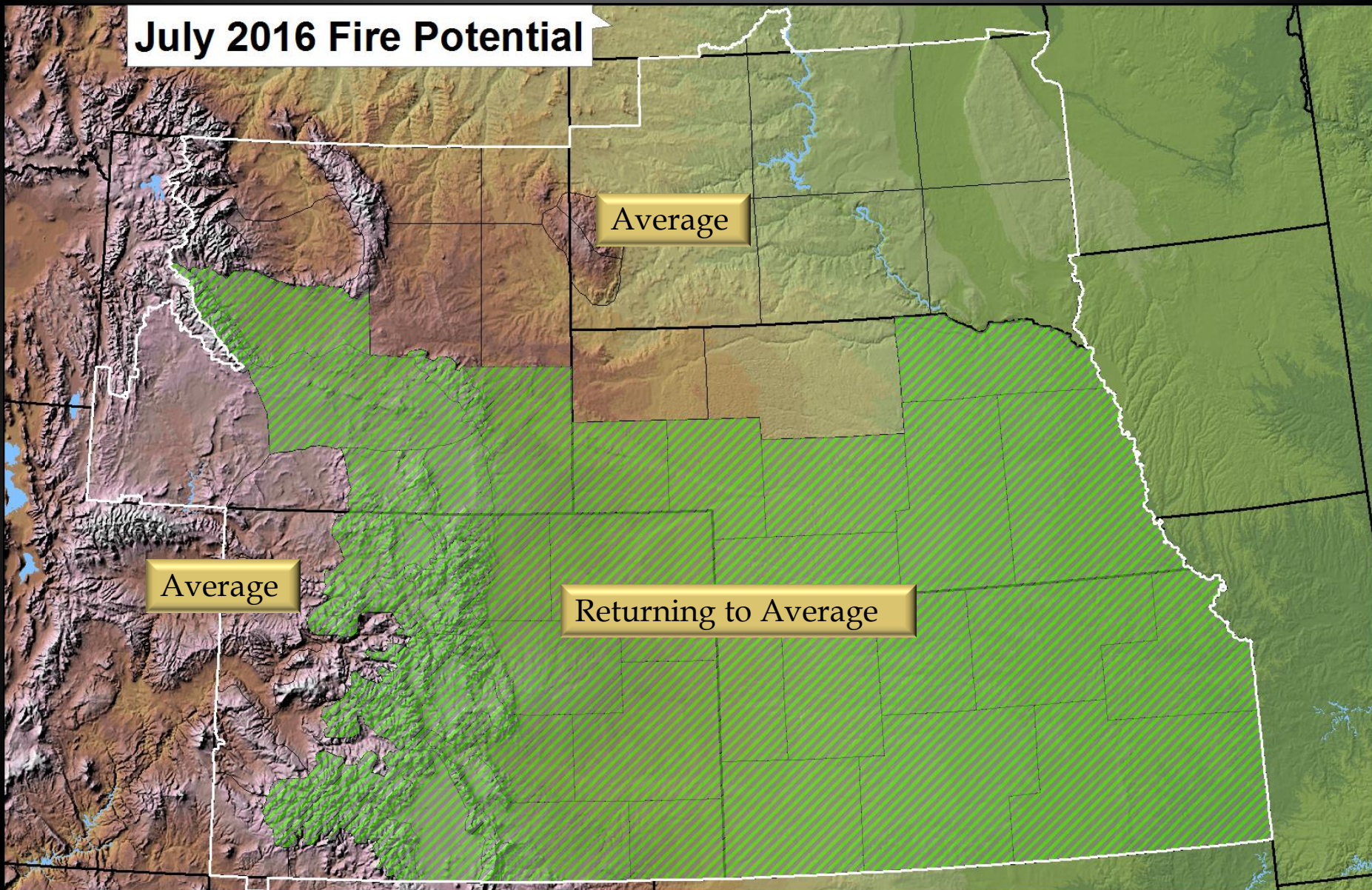
# Seasonal Outlook

July 2016 Fire Potential

Average

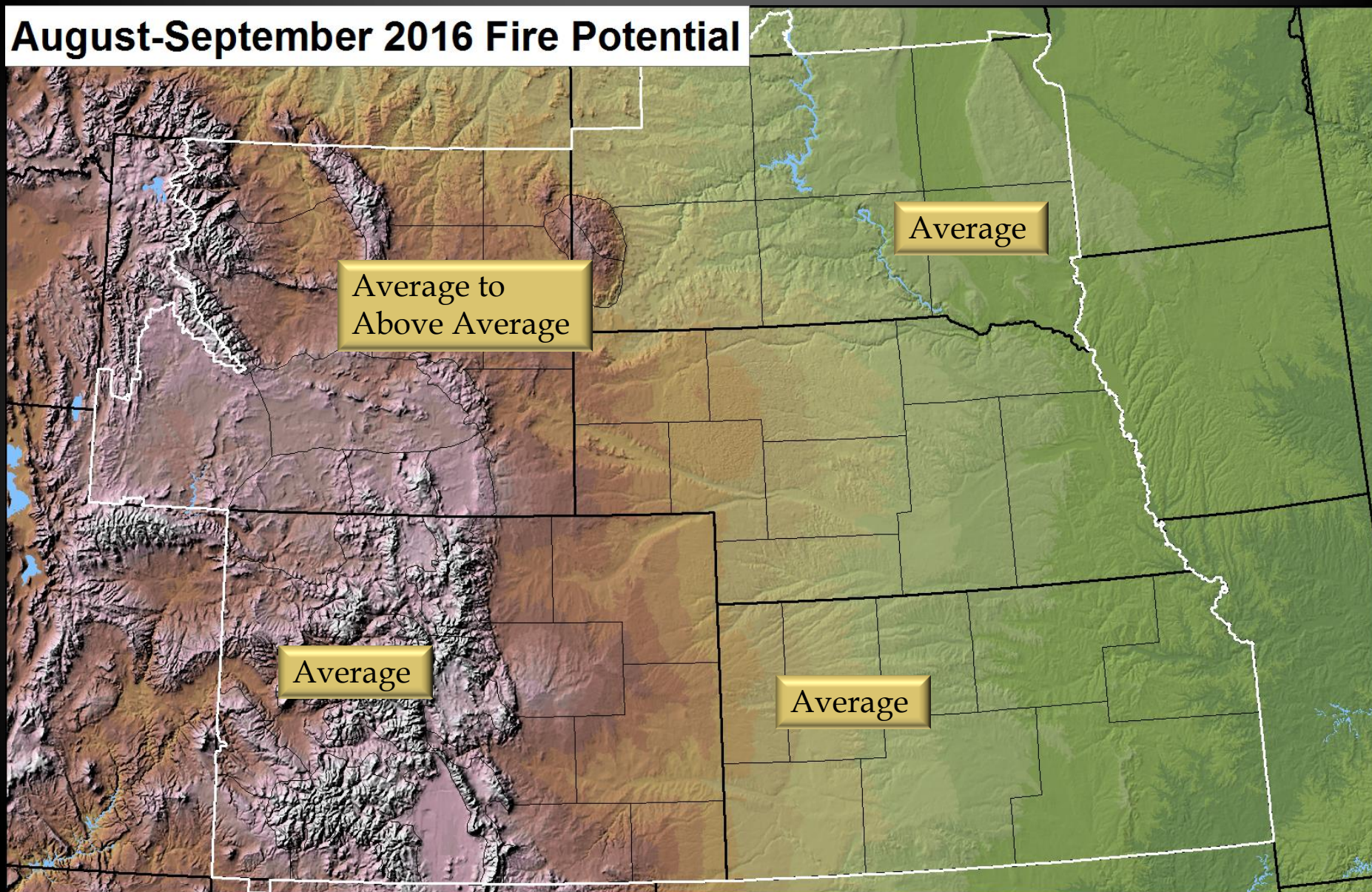
Average

Returning to Average



# Seasonal Outlook

August-September 2016 Fire Potential



# Seasonal Outlook–Summary

## 2016 Seasonal Fire Potential Outlook Summary-

### Current Climatology

Most of the RMA experienced above average precipitation and below average temperatures during the month of May, with the exception of drier and slightly warmer than average conditions across northwest South Dakota into the Black Hills, and the far northwest portion of Wyoming. Precipitation deficits were most notable this spring in and around the Black Hills of South Dakota at 50-75% of average. Significant mountain snowpack deficits have developed as of late May across northern Wyoming (65%-70% of average), although snowpack typically this time of year is well below its' seasonal peak which occurs in April. Conversely, snowpack was around 150% of average across the southern half of Wyoming into Colorado as of late May. Drought indices improved from last month with most of the RMA not included in long term drought (National Drought Mitigation Center), with the exception of "abnormally dry" indices lingering in far southwest Colorado, and "abnormally dry" to "moderate" values across portions of northern Wyoming into the Black Hills of western South Dakota.

### Fuels

Lower elevation green-up is progressing across the RMA, however, some of the lower elevation grass fuel regimes are expected to reach their cured phase by mid-month. An abundant dead grass fuel component remains in place in the lower elevations from previous growing seasons and is expected to increase this summer as grasses from a wet spring/early summer cure out. Higher elevation fuel regimes are anticipated to begin their green-up phase during June, although more of these higher elevations are under snow cover than in an average year. Increased soil moisture should lead to a typical green-up in live fuels.

### Weather Predictions

Short term forecasts for the early portion of June indicate average temperatures with opportunities for precipitation most prevalent east of the continental divide. A waning El Nino event is predicted to reach a neutral phase by the end of June, with La-Nina conditions by August or early fall along with the resultant possibility of a drier than average conditions across northern portions of the RMA. Otherwise, long range outlooks for June maintain an average to wetter/cooler than average environment, except near average precipitation/temperatures across far northern portions of the region. For July, an average temperature and precipitation regime is predicted, with August-September predictors pointing towards warmer and drier than average conditions in the north, and average in the south.

### Considerations and Fire Season Outlook

As a result of recent and forecast precipitation across the RMA and severity indices, an average progression of green-up has eliminated the threat of an earlier than average onset to the 2016 core wildfire season. All of the bigger RMA fire seasons in the past since 2000 (2000, 2002, 2006, 2012) were characterized by warm and dry spring months leading into the early summer, early snowmelt in the higher elevations, and widespread precipitation deficits, which has not been the case this spring. The RMA core wildfire season typically begins late May over southern Colorado and gradually progresses northward across the RMA through the remainder of the summer months. Below average fire potential is predicted during June over the higher elevations of Colorado mainly near and east of the continental divide into eastern Colorado, portions of central to southeast Wyoming, Kansas, and much of Nebraska. Near to slightly below average large fire activity is forecast for the RMA during July. For August and September, expectations are for near to above average fire potential in northern portions of the region, and average in the south. Abundant grass fuels from previous growing seasons and recent spring/early summer moisture may contribute to an increase in ignition and total acres burned overall for the RMA during the July-September period compared to the very slow 2015 season.